

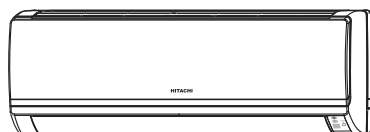
HITACHI

SERVICE MANUAL

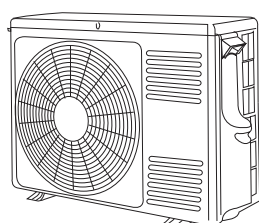
TECHNICAL INFORMATION

FOR SERVICE PERSONNEL ONLY

INDOOR UNIT



OUTDOOR UNIT



RAK-18PSPA
RAK-25PSPA
RAK-35PSPA

RAC-18WSPA
RAC-25WSPA
RAC-35WSPA



HHAW

NO. 0073E

RAK-18PSPA/RAC-18WSPA
RAK-25PSPA/RAC-25WSPA
RAK-35PSPA/RAC-35WSPA

REFER TO THE FOUNDATION MANUAL

CONTENTS

SPECIFICATIONS	6
HOW TO USE	8
CONSTRUCTION AND DIMENSIONAL DIAGRAM	27
MAIN PARTS COMPONENT	29
WIRING DIAGRAM	31
CIRCUIT DIAGRAM	33
BLOCK DIAGRAM	35
BASIC MODE	36
REFRIGERATING CYCLE DIAGRAM	46
Procedure for Disassembly and Reassembly	47
DESCRIPTION OF MAIN CIRCUIT OPERATION	49
SERVICE CALL Q & A	66
TROUBLE SHOOTING	69
PARTS LIST AND DIAGRAM	97

SPECIFICATIONS

TYPE		DC INVERTER					
		INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT	INDOOR UNIT	OUTDOOR UNIT
MODEL		RAK-18PSPA	RAC-18WSPA	RAK-25PSPA	RAC-25WSPA	RAK-35PSPA	RAC-35WSPA
POWER SOURCE		1 PHASE,50HZ,220-230V		1 PHASE,50HZ,220-230V		1 PHASE,50HZ,220-230V	
COOLING	TOTAL INPUT (W)	300 (70 ~ 880)		490(70~960)		845 (70 ~1350)	
	TOTAL AMPERES (A)	1.70-1.70		2.70-2.60		4.30-4.20	
	CAPACITY	(KW)		1.80 (0.50~2.80)		2.50 (0.50~3.40)	
		(B.T.U./h)		6,120 (1,700~9,520)		8,500 (1,700~11,560)	
HEATING	TOTAL INPUT (W)	375 (65 ~1,620)		585 (65~2,250)		830 (65 ~2,450)	
	TOTAL AMPERES (A)	2.10-2.00		3.10-3.00		4.30-4.10	
	CAPACITY	(KW)		2.30 (0.60~4.80)		3.20 (0.60~5.80)	
		(B.T.U./h)		7,820 (2,040~16,320)		10,880 (2,040~19,720)	
DIMENSIONS (mm)	W	780	792	780	792	780	792
	H	280	600	280	600	280	600
	D	218	299	218	299	218	299
NET WEIGHT (Kg)		8.0	44	8.0	44	8.0	44

※ After installation

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

ROOM AIR CONDITIONER

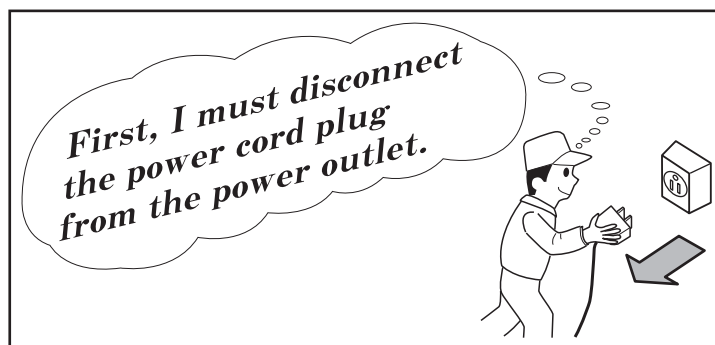
INDOOR UNIT + OUTDOOR UNIT

JULY 2013

Hitachi Household Appliances(Wuhu) Co., Ltd.

SAFETY DURING REPAIR WORK

1. In order to disassemble and repair the unit in question, be sure to disconnect the power cord plug from the power outlet before starting the work.



2. If it is necessary to replace any parts, they should be replaced with respective genuine parts for the unit, and the replacement must be effected in correct manner according to the instructions in the Service Manual of the unit.

If the contacts of electrical parts are defective, replace the electrical parts without trying to repair them



3. After completion of repairs, the initial state should be restored.
4. Lead wires should be connected and laid as in the initial state.
5. Modification of the unit by the user himself should absolutely be prohibited.
6. Tools and measuring instruments for use in repairs or inspection should be accurately calibrated in advance.
7. In installing the unit having been repaired, be careful to prevent the occurrence of any accident such as electrical shock, leak of current, or bodily injury due to the drop of any part.
8. To check the insulation of the unit, measure the insulation resistance between the power cord plug and grounding terminal of the unit.
The insulation resistance should be $1M\Omega$ or more as measured by a 500V DC megger.
9. The initial location of installation such as window, floor or the other should be checked for being safe enough to support the repaired unit again.
If it is found not so strong and safe, the unit should be installed at the initial location after reinforced or at a new location.
10. Any inflammable object must not be placed about the location of installation.
11. Check the grounding to see whether it is proper or not, and if it is found improper, connect the grounding terminal to the earth.



WORKING STANDARDS FOR PREVENTING BREAKAGE OF SEMICONDUCTORS

1. Scope

The standards provide for items to be generally observed in carrying and handling semiconductors in relative manufactures during maintenance and handling thereof. (They apply the same to handling of abnormal goods such as rejected goods being returned.)

2. Object parts

- (1) Microcomputer
- (2) Integrated circuits (I.C.)
- (3) Field effective transistor (F.E.T.)
- (4) P.C. boards or the like to which the parts mentioned in (1) and (2) of this paragraph are equipped.

3. Items to be observed in handling

- (1) Use a conductive container for carrying and storing of parts. (Even rejected goods should be handled in the same way.)

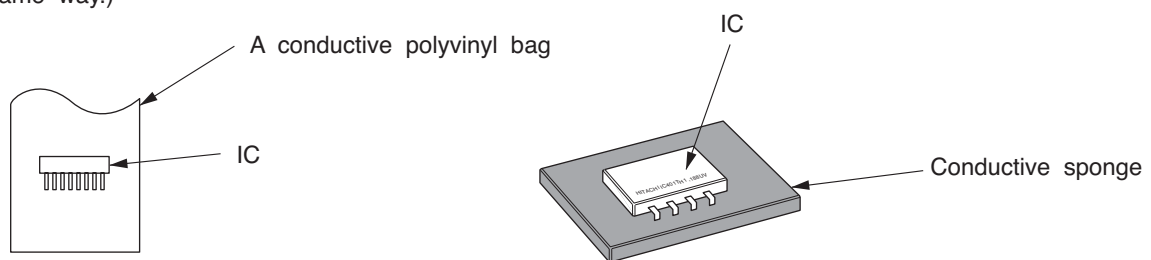


Fig. 1 Conductive container

- (2) When any part is handled uncovered (in counting, packing and the like), the handling person must always use himself as a body earth. (Make yourself a body earth by passing one M ohm earth resistance through a ring or bracelet.)
- (3) Be careful not to touch the parts with your clothing when you hold a part even if a body earth is being taken.
- (4) Be sure to place a part on a metal plate with grounding.
- (5) Be careful not to fail to turn off power when you repair the printed circuit board. At the same time, try to repair the printed circuit board on a grounded metal plate.

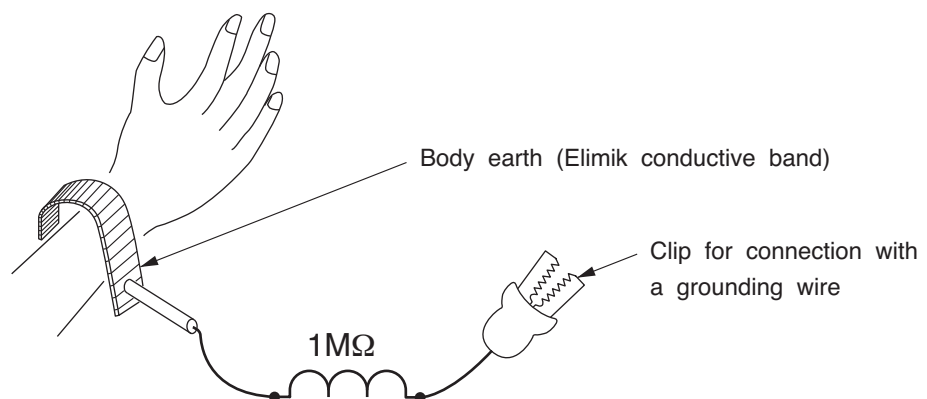


Fig. 2 Body earth

(6) Use a three wire type soldering iron including a grounding wire.

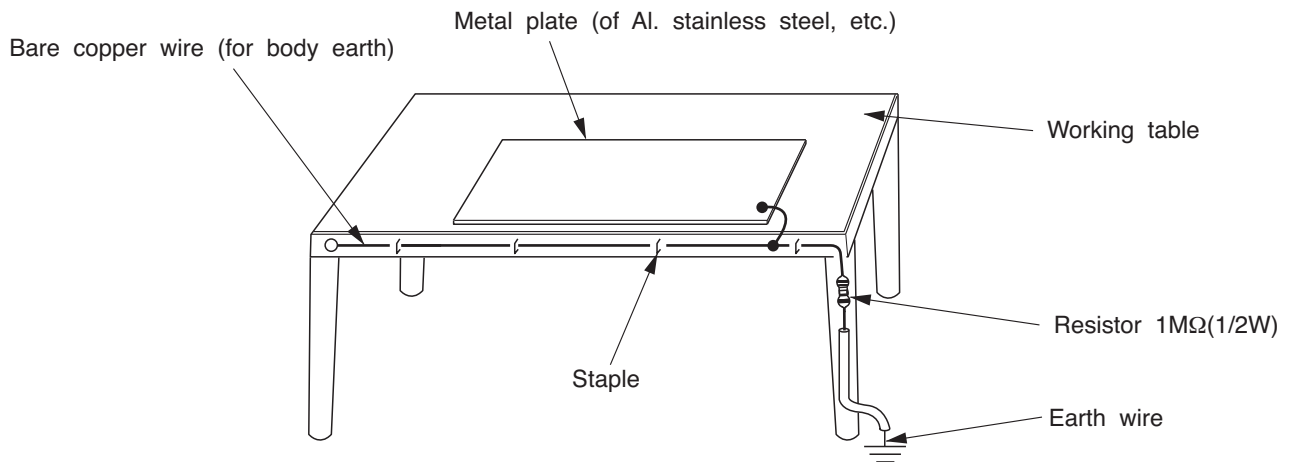


Fig.3 Grounding of the working table

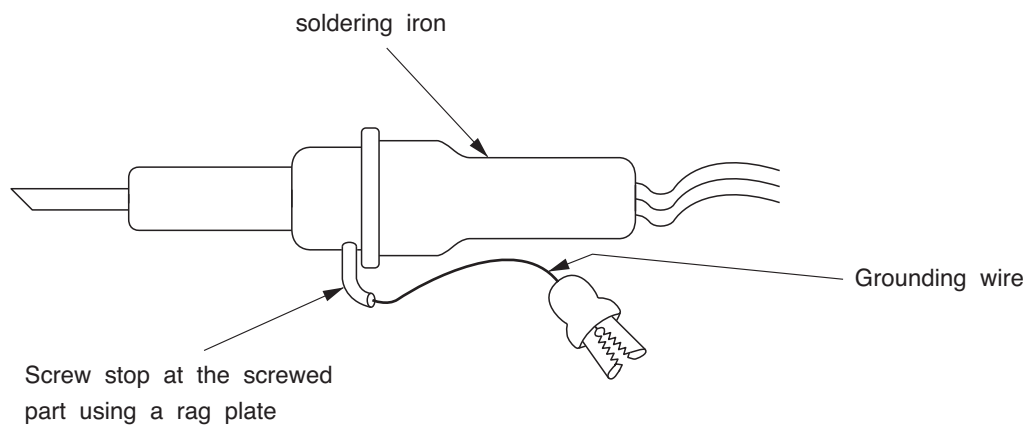


Fig.4 Grounding a solder iron

Use a high insulation mode (100V, 10MΩ or higher) when ordinary iron is to be used.

(7) In checking circuits for maintenance, inspection, or some others, be careful not to have the test probes of the measuring instrument short circuit a load circuit or the like.

⚠ CAUTION

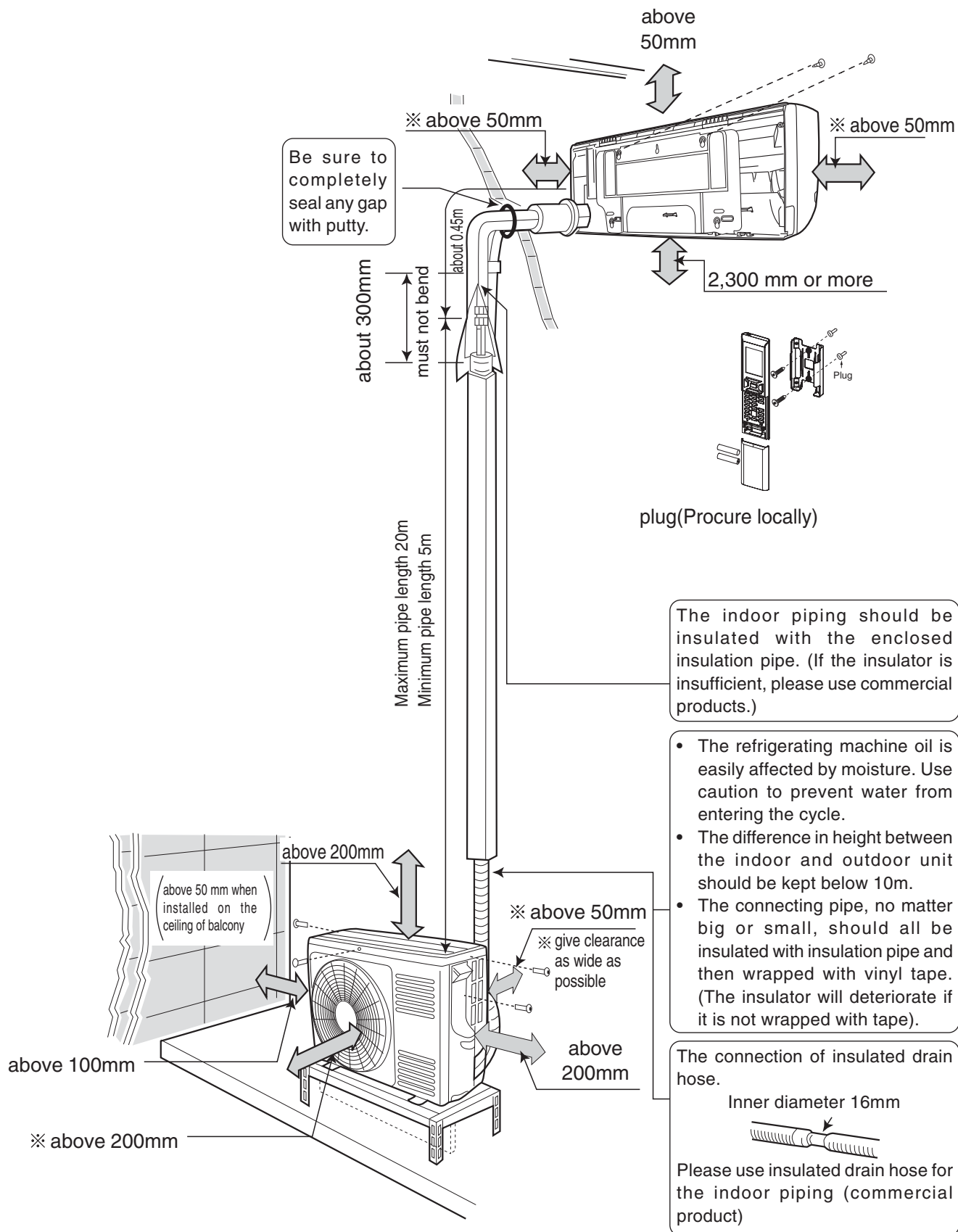
1. In quiet operation or stopping the running, slight flowing noise of refrigerant in the refrigerating cycle is heard occasionally, but this noise is not abnormal for the operation.
2. When it thunders near by, it is recommend to stop the operation and to disconnect the power cord plug from the power outlet for safety.
3. The room air conditioner does not start automatically after recovery of the electric power failure for preventing fuse blowing. Re-press START/STOP button after 3 minutes from when unit stopped.
4. If the room air conditioner is stopped by adjusting thermostat, or missoperation, and re-start in a moment, there is occasion that the cooling and heating operation does not start for 3 minutes, it is not abnormal and this is the result of the operation of IC delay circuit. This IC delay circuit ensures that there is no danger of blowing fuse or damaging parts even if operation is restarted accidentally.
5. This room air conditioner should not be used at the cooling operation when the outside temperature is below -10°C (14°F).
6. This room air conditioner (the reverse cycle) should not be used when the outside temperature is below -20°C (-4°F).
If the reverse cycle is used under this condition, the outside heat exchanger is frosted and efficiency falls.
7. When the outside heat exchanger is frosted, the frost is melted by operating the hot gas system, it is not trouble that at this time fan stops and the vapour may rise from the outside heat exchanger.

SPECIFICATIONS

MODEL		RAK-18PSPA RAK-25PSPA RAK-35PSPA	RAC-18WSPA	RAC-25WSPA RAC-35WSPA
FAN MOTOR		25W (DC35V)	47W (DC120~380V)	
FAN MOTOR CAPACITOR		NO	NO	
FAN MOTOR PROTECTOR		NO	NO	
COMPRESSOR		—	EU125XB2	
COMPRESSOR MOTOR CAPACITOR		NO	NO	
OVERLOAD PROTECTOR		NO	YES	
OVERHEAT PROTECTOR		NO	YES	
FUSE (for MICROPROCESSOR)		NO	3.15A	
POWER RELAY		NO	G4A-1A	
POWER SWITCH		NO	NO	
TEMPORARY SWITCH		YES	NO	
SERVICE SWITCH		NO	YES	
TRANSFORMER		NO	NO	
VARISTOR		NO	450NR	
NOISE SUPPRESSOR		NO	NO	
THERMOSTAT		YES(IC)	NO	
REMOTE CONTROL SWITCH (LIQUID CRYSTAL)		YES	NO	
REFRIGERANT CHARGING VOLUME (Refrigerant 410A)	UNIT	-----	1330g	1350g
	PIPES (MAX. 20m) (MIN. 5m)	WITHOUT REFRIGERANT BECAUSE COUPLING IS FLARE TYPE.		

Figure showing the installation of Indoor and Outdoor unit

MODEL RAK-18PSPA/RAC-18WSPA
 RAK-25PSPA/RAC-25WSPA
 RAK-35PSPA/RAC-35WSPA



SAFETY PRECAUTION

- Please read the "Safety Precaution" carefully before operating the unit to ensure correct usage of the unit.
- Pay special attention to signs of "▲ Warning" and "▲ Caution". The "Warning" section contains matters which, if not observed strictly, may cause death or serious injury. The "Caution" section contains matters which may result in serious consequences if not observed properly. Please observe all instructions strictly to ensure safety.
- The signs indicate the following meanings. (The following are examples of signs.)

	Make sure to connect earth line.
	This sign in the figure indicates prohibition
- Please keep this manual after reading.

PRECAUTIONS DURING INSTALLATION

▲ WARNING	Do not reconstruct the unit. Water leakage, fault, short circuit or fire may occur if you reconstruct the unit by yourself.	
	Please ask your sales agent or qualified technician for the installation of your unit. Water leakage, short circuit or fire may occur if you install the unit by yourself.	
▲ CAUTION	Please use earth line. Do not place the earth line near water or gas pipes, lightning-conductor, or the earth line of telephone. Improper installation of earth line may cause electric shock.	
	Be sure to use the specified piping set for R410A. Otherwise, this may result in broken copper pipes or faults.	
	A circuit breaker should be installed depending on the mounting site of the unit. Without a circuit breaker, the danger of electric shock exists.	
	Do not install the unit near a location where there is flammable gas. The outdoor unit may catch fire if flammable gas leaks around it. Piping shall be suitable supported with a maximum spacing of 1m between the supports.	
▲ CAUTION	Please ensure smooth flow of water when installing the drain hose. If any failure is found in the drain path, water drops from the indoor and outdoor units, causing wet household effects.	
	Make sure that a single phase 230V power source is used. The use of other power sources may cause electrical components to overheat and lead to fire.	

PRECAUTIONS DURING SHIFTING OR MAINTENANCE

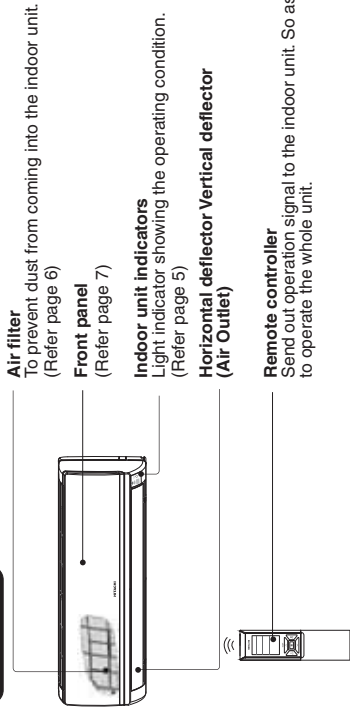
▲ WARNING	Should abnormal situation arise (like burning smell), please stop operating the unit and remove plug from the socket or turn off the circuit breaker. Contact your agent. Fault, short circuit or fire may occur if you continue to operate the unit under abnormal situation.	
	Please contact your agent for maintenance. Improper self maintenance may cause electric shock and fire.	
	Please contact your agent if you need to remove and reinstall the unit. Electric shock or fire may occur if you remove and reinstall the unit yourself improperly.	
	Avoid an extended period of direct air flow for your health.	
	Do not connect the power cable with an extension cable or do not plug too many leads of the other electric appliance into the socket where this cable is plugged. In addition, wire the cable with some allowances to prevent the cable from stretching. Not doing so will cause an electrical shock, heat generation or fire.	
	Do not bundle the power cable, pull it, put something on it, heat it, process it, or put it between things. Breakage of the power cable may result. Use of a damaged cable may cause an electrical shock or a fire.	
▲ WARNING	Do not put objects like thin rods into the panel of blower and suction side because the high-speed fan inside may cause danger.	

PRECAUTIONS DURING OPERATION

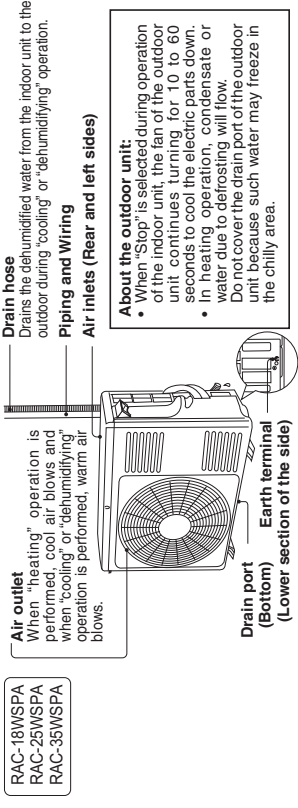
▲ WARNING	Do not use any conductor as fuse wire, this could cause fatal accident.	
	During thunder storm, disconnect the plug top or turn off the circuit breaker.	
	Spray cans and other combustibles should not be located within a meter of the air outlets of both indoor and outdoor units. As a spray can's internal pressure can be increased by hot air, a rupture may result.	
	The product shall be operated under the manufacturer specification and not for any other intended use.	
	Do not attempt to operate the unit with wet hands, this could cause fatal accident.	
	When operating the unit with burning equipments, regularly ventilate the room to avoid oxygen insufficiency.	
▲ CAUTION	Do not direct the cool air coming out from the air-conditioner panel to face household heating apparatus as this may affect the working of apparatus such as the electric kettle, oven etc.	
	Please ensure that outdoor mounting frame is always stable, firm and without defect. If not, the outdoor unit may collapse and cause danger.	
	Do not wash the unit with water or place a water container such as a vase on the indoor unit. Electrical leakage could be present and cause electric shock.	
	Do not place plants or animals directly under the air flow as it is bad for the plants or animals.	
	Do not climb on the outdoor unit or put objects on it.	
	When operating the unit with the door and windows opened, (the room humidity is always above 80%) and with the air deflector facing down or moving automatically for a long period of time, water will condense on the air deflector and drips down occasionally. This will wet your furniture. Therefore, do not operate under such condition for a long time.	
	If the amount of heat in the room is above the cooling or heating capability of the unit (for example: more people entering the room, using heating equipments and etc.), the preset room temperature cannot be achieved.	
	This appliance especially indoor unit cleaning must be performed by authorized personnel only. Consult your sales agent. Using a commercially available detergent or similar can damage the plastic parts or clog the drain pipe, causing water to drip with potential electric shock hazard.	
	Do not touch the air outlet, bottom surface and aluminum fin of the outdoor unit. You may get hurt.	
	Do not touch the refrigerant pipe and connecting valve. Burns may result.	
▲ WARNING	This appliance is not intended for use by young children or infirm persons unless they have been adequately supervised by a responsible person to ensure that they can use this appliance safely.	
	Young children should be supervised to ensure that they do not play with the appliance.	

NAMES AND FUNCTIONS OF EACH PART

INDOOR UNIT



OUTDOOR UNIT

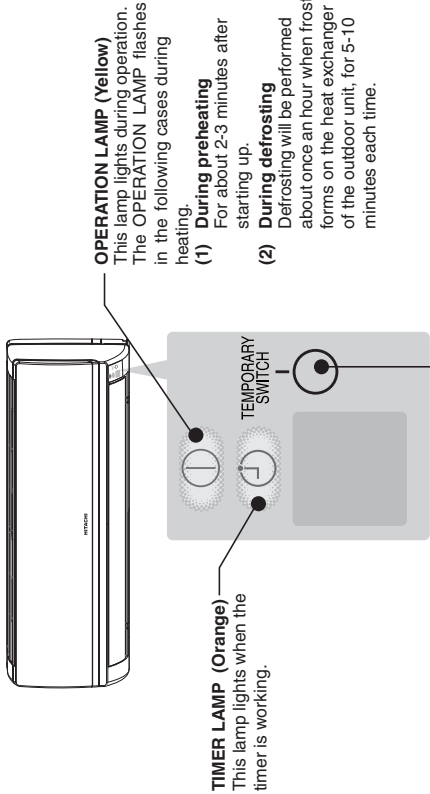


MODEL NAME AND DIMENSIONS

MODEL	WIDTH (mm)	HEIGHT (mm)	DEPTH (mm)
RAK-18WSPA, RAK-25WSPA, RAK-35WSPA	780	280	218
RAK-18WSPA, RAK-25WSPA, RAK-35WSPA	792	600	299

NAMES AND FUNCTIONS OF EACH PART

INDOOR UNIT INDICATIONS



TEMPORARY SWITCH

- Use this switch to start and stop when the remote controller does not work.
- This temporary operation will be at the most recent setting made. (The unit will immediately go into automatic operation once power is switched on.)

CAUTION

Turn off the circuit breaker or pull out the power plug if the unit is not be operated for a long period.

☆ If the power stays on and the unit is not operated, power is slightly consumed in the control circuit. The power is saved by turning off the power switch (or the circuit breaker when the power is supplied from the outdoor unit).

MAINTENANCE

⚠ CAUTION

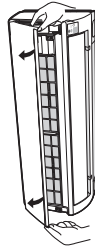
Cleaning and maintenance must be carried out only by qualified service personnel. Before cleaning, stop operation and switch off the power supply.

1. AIR FILTER

Please clean the filter once about every two weeks. By doing so, the power rates are saved. In case the air filter is full of dust, the air flow will decrease and the cooling capacity will be reduced. Further, noise may occur. Be sure to clean the filter following the procedure below.

PROCEDURE

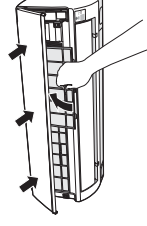
1 Open the front panel carefully and remove the filter.



2 Vacuum dust from the air filter using vacuum cleaner. If there is too much dust, wash the filter with a detergent and rinse it thoroughly. After that, dry it in the shade.



3 • Set the filter with "FRONT" mark facing front, and slot them into the original state.
• After attaching the filters, push the front panel at three arrow portions as shown in figure and close it.



⚠ CAUTION

- Do not wash with hot water at more than 40°C. The filter may shrink.
- When washing it, shake off moisture completely and dry it in the shade; do not expose it directly to the sun. The filter may shrink.
- Don't operate the unit without filter. Fault may occur if you continue.

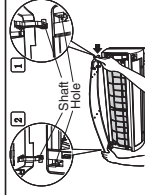
2. CLEANING OF FRONT PANEL

- Remove the front panel and wash with clean water. Wash it with a soft sponge. After using neutral detergent, wash thoroughly with clean water.
- When front panel is not removed, wipe it with a soft dry cloth. Wipe the remote controller thoroughly with a soft dry cloth.
- Wipe the water thoroughly. If water remains at indicators or signal receiver of indoor unit, it causes trouble.

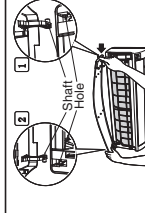


Method of removing the front panel.
Be sure to hold the front panel with both hands to detach and attach it.

Removing the Front Panel



Attaching the Front Panel



- When the front panel is fully opened with both hands, push the right arm to the inside to release it, and while closing the front panel slightly, put it out forward.
- Move the shafts of the left and right arms into the steps in the unit and securely insert them into the holes.

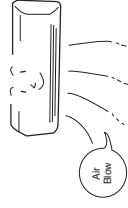
⚠ CAUTION

- Do not splash or direct water to the body of the unit when cleaning it as this may cause short circuit.
- Never use hot water (above 40°C), benzene, gasoline, acid, thinner or a brush, because they will damage the plastic surface and the coating.



3. MAINTENANCE AT BEGINNING OF LONG OFF PERIOD

- Run the unit by setting the operation mode to **★ (FAN)** and the fan speed to H1 for about half a day on a fine day, and dry the whole of the unit.
- Switch off the power plug or turn off the circuit breaker.



INFORMATION

CAPABILITIES

Heating Capability

- This room air conditioner utilizes a heat pump system that absorbs exterior heat and brings it into a room to be heated. As the ambient temperature gets lower, heating capability will also lower. In such a situation, the inverter work to increase compressor rpm to keep the unit's heating capability from decreasing. If the unit's heating performance is still unsatisfactory, other heating appliances should be used to augment this unit's performance.

- The air conditioner is designed to heat an entire room so that it may take some time before you feel warm. Timer operation is recommended for effective preheating ahead of the desired time.

Cooling and Dehumidifying Capabilities

- If the heat present in a room exceeds the unit's cooling capacity (for example, if there are many people in the room or other heating appliances are used), the preset room temperature may not be reached.

CAUTION

Do not use a stove or any other high-temperature devices in proximity to the indoor unit.

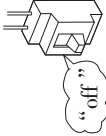
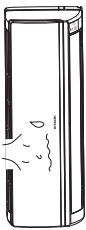


PROHIBITION

When lightning occurs

Warning

To protect the whole unit during lightning please stop operating the unit and turn off the circuit breaker.



REGULAR INSPECTION

PLEASE CHECK THE FOLLOWING POINTS EVERY EITHER HALF YEARLY OR YEARLY. CONTACT YOUR SALES AGENT SHOULD YOU NEED ANY HELP.

1		WARNING	Check to see if the unit's earth line has been connected correctly. If the earth line is disconnected or faulty, unit failure or electric shock hazard may result.
2		WARNING	Check to see if the mounting frame has rusted excessively or if the outdoor unit has tilted or become unstable. It could collapse or fall, causing injury.
3		WARNING	Check to see if the power plug is securely inserted into the wall socket. If the power plug is not inserted into the wall socket securely or becomes hot, an electric shock or fire may result. If dust or dirt is found on the power plug, clean the plug and insert it into the wall socket.

AFTER SALES SERVICE AND WARRANTY

WHEN ASKING FOR SERVICE, CHECK THE FOLLOWING POINTS.

CONDITION	CHECK THE FOLLOWING POINTS
 If the remote controller is not transmitting a signal. (Remote controller display is dim or blank.)	• Do the batteries need replacement? • Is the polarity of the inserted batteries correct?
 When it does not operate.	• Is the fuse all right? • Is the voltage extremely high or low? • Is the circuit breaker "ON"? • Is the power plug inserted? • Do you have any power cut?
 When it does not cool well. When it does not heat well.	• Is the air filter blocked with dust? • Is the set temperature suitable? • Have horizontal air deflectors been adjusted to their correct positions according to the operation mode selected? • Are the air inlets or air outlets of indoor and outdoor units blocked? • Is the fan speed "LOW" or "SILENT"?

The following phenomena do not indicate unit failure.

 During heating, the operation indicator blinks and air blow stops	<Operation start> The unit is preparing to blow warm air. Please wait. <In operation> The outdoor unit is defrosting. Please wait.
 Hissing or fizzy sounds	Refrigerant flow noise in the pipe or valve sound generated when flow rate is adjusted.
 Squeaking noise	Noise generated when the unit expands or contracts due to temperature changes.
 Rustling noise	Noise generated with the indoor unit fan's rpm changing such as operation start times.
 Clicking noise	Noise of the motorized valve when the unit is switched on.



Perking noise	Noise of the ventilation fan sucking in air present in the drain hose and blowing out dehumidifying water that had accumulated in the condensed water collector. For details, consult your sales agent.
Changing operation noise	Operation noise changes due to power variations according to room temperature changes.
Mist emission	Mist is generated as the air within the room is suddenly cooled by conditioned air.
Steam emitted from the outdoor unit	Water generated during defrosting operation evaporates and steam is emitted.
Odors	Caused as the smells and particles of smoke, food, cosmetics, etc. present in room air become attached the unit and blown off into the room again.
The outdoor unit continues to operate even if operation is stopped.	Defrosting is underway (as the heating operation is stopped, the microcomputer checks frost accumulated in the outdoor unit and instructs the unit to perform automatic defrosting if necessary).
The OPERATION lamp is blinking.	Shows preheating or defrosting operation is underway. As the protective circuit or preheat sensor operates when unit operation is stopped during preheating and then restarted, or when operation mode is switched from cooling to heating, the lamp continues to blink.
Does not reach the temperature setting	Actual room temperature may deviate slightly from the remote controller's temperature setting depending on the number of people in the room, indoor or outdoor conditions.

- If the unit still fails to operate normally after performing the above inspections, turn the circuit breaker off, or pull the power plug out, and contact your sales agent immediately.

Contact your sales agent immediately if the following phenomena should occur:

- The circuit breaker switches off or the fuse blows frequently.
- The switch operation is not stable.
- Foreign matter or water accidentally enters the unit interior.
- The power cord gets excessively hot or its insulation is torn or stripped.
- TIMER lamp on the indoor unit display blinks.

(As the nature of the failure can be identified by the blinking cycle, check the blinking cycle before turning off the circuit breaker.)

Notes

- In quiet operation or stopping the running, the following phenomena may occasionally occur, but they are not abnormal for the operation.
(1) Slight flowing noise of refrigerant in the refrigerating cycle.
(2) Slight rubbing noise from the fan casing which is cooled and then gradually warmed as operation stops.
- The odor will possibly be emitted from the room air conditioner because the various odor, emitted by smoke, foodstuffs, cosmetics and so on, sticks to it. So please clean the air filter and the evaporator regularly to reduce the odor.

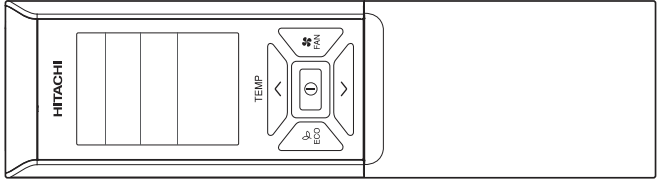
- Please contact your sales agent immediately if the air conditioner still fails to operate normally after the above inspections. Inform your agent of the model of your unit, production number, date of installation. Please also inform him regarding the fault.
- Please note:
On switching on the equipment, particularly when the room light is dimmed, a slight brightness fluctuation may occur. This is of no consequence.
The conditions of the local Power Supply Companies are to be observed.

HITACHI

Inspire the Next

Remote Controller Manual

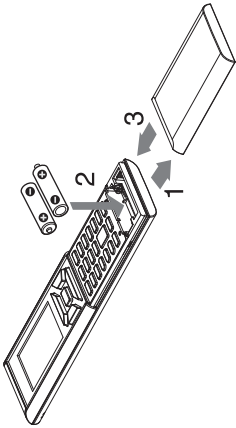
MODEL
RAR-5E2



ENGLISH

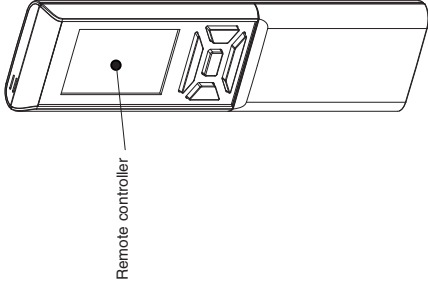
PREPARATION BEFORE OPERATION

■ To install the batteries

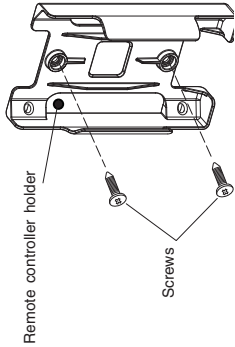


1. Slide the cover to take it off.
2. Install two dry batteries AAA-LR03 (alkaline). The direction of the batteries should match the marks in the case.
3. Replace the cover at its original position.

■ To fix the remote controller holder to the wall



1. Choose a place from where the signals can reach the unit.
2. Fix the remote controller holder to a wall, a pillar or similar location with the provided screws.
3. Place the remote controller in the remote controller holder.



NOTE

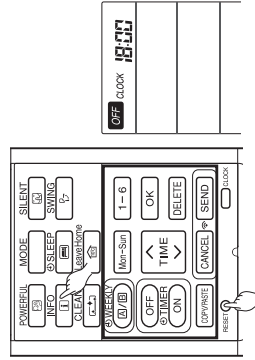
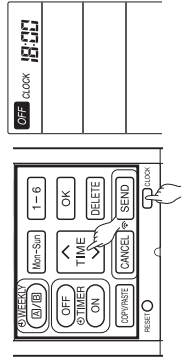
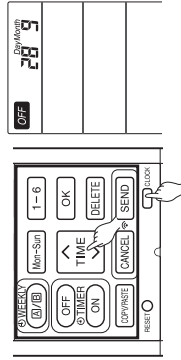
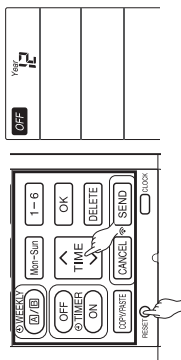
Notes on batteries

- When replacing the batteries, use batteries of the same type, and replace both old batteries together.
- When the system is not used for a long time, take the batteries out.
- The batteries will last for approximately 1 year. However, if the remote controller display begins to fade and degradation of reception performance occurs within a year, replace both batteries with new size AAA-LR03 (alkaline).
- The attached batteries are provided for the initial use of the system.
The usable period of the batteries may be short depending on the manufactured date of the air conditioner.

Notes on the remote controller

- Never expose the remote controller to direct sunlight.
- Dust on the signal transmitter or receiver will reduce the sensitivity. Wipe off dust with soft cloth.
- Signal communication may be disabled if an electronic-starter-type fluorescent lamp (such as inverter-type lamps) is in the room. Consult the shop if that is the case.
- If the remote controller signals happen to operate another appliance, move that appliance to somewhere else, or consult the service shop.
- When the remote controller is not in use, please close the slide cover to prevent failure.

PREPARATION BEFORE OPERATION



NOTE

- Note on setting the calendar and clock.
- If the calendar and clock are not set, the ON-timer, OFF-timer and Weekly Timer cannot be set.
 - If the calendar and clock are not set correctly, the ON-timer, OFF-timer and Weekly Timer will not operate correctly.
 - When the ON-timer, OFF-timer and Weekly Timer are set, the calendar and clock cannot be changed. If need to change the calendar and clock, ON-timer, OFF-timer and Weekly Timer need to be cancelled.

ENGLISH

■ To set calendar and clock

1. Press **RESET** (RESET) button when first time setting. "Year" blinks.
2. Press **TIME** (TIME) button to set the current year.
3. Press **CLOCK** (CLOCK) button. Next, "Day" and "Month" blink.
4. Press **TIME** (TIME) button to set the current day and month.
5. Press **CLOCK** (CLOCK) button. Next, "CLOCK" blinks.
6. Press **TIME** (TIME) button to set the clock to the current time.
7. Press **CLOCK** (CLOCK) button.

Calendar and clock are set.

To modify the calendar and clock, press **CLOCK** (CLOCK) button.
Then follow steps 1 to 7.

Calendar and clock shall be set again after changing batteries.

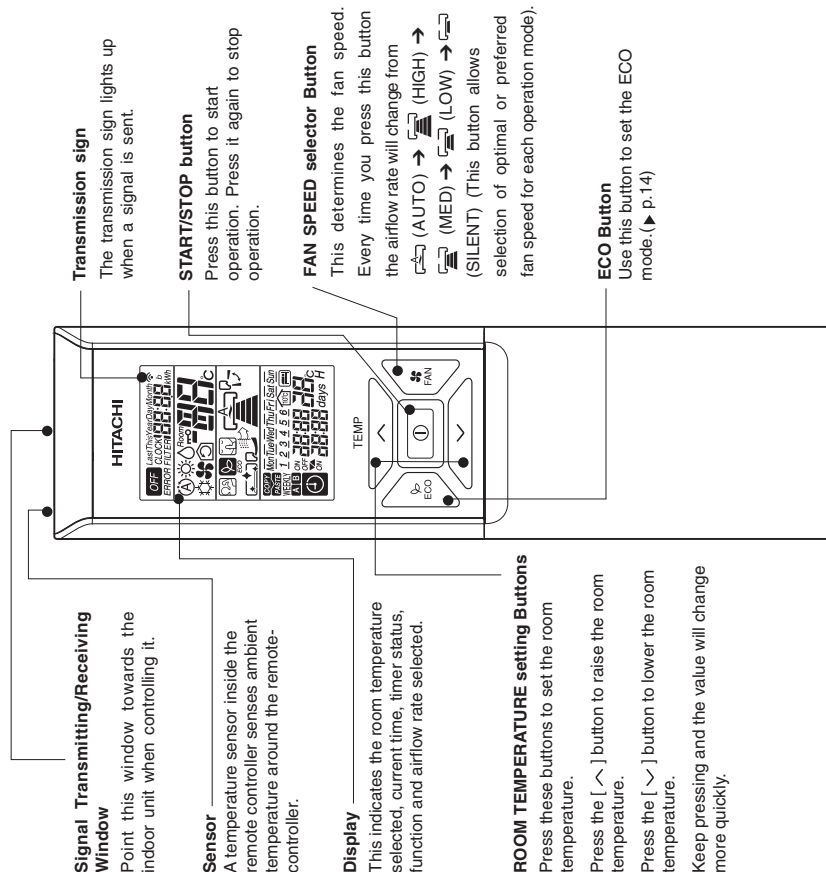
After changing the batteries,

1. Press **RESET** (RESET) button.
 2. Direct remote control towards indoor unit and press **INFO** (INFO) button.
 3. The calendar and clock from indoor unit will be transmitted.
- Calendar and clock will not be transmitted from indoor unit when the following occurs:
- When there is a power failure.
 - When breaker is OFF by user (unit is not in STANDBY MODE).

NAMES AND FUNCTIONS OF REMOTE CONTROLLER

REMOTE CONTROLLER

- This controls the operation of the indoor unit. The range of control is about 7 meters. If indoor lighting is controlled electronically, the range of controller may be shorter.
This unit can be fixed on a wall using the fixture provided. Before fixing it, make sure the indoor unit can be controlled from the remote controller.
- Handle the remote controller with care. Dropping it or getting it wet may compromise its signal transmission capability.
- After new batteries are inserted into the remote controller, the unit will initially require approximately 10 seconds to respond to commands and operate.
- When remote controller is not in use for about 3 minutes during OFF condition, indicated by **OFF** on the display, the LCD will turn off.
- During clock setting, the LCD will turn off about 10 minutes later if the remote controller is not in use.
- When pressing any button, the LCD will turn on.
- The LCD will not turn off during TIMER setting.



NAMES AND FUNCTIONS OF REMOTE CONTROLLER

HS179NE

MODE selector Button

POWERFUL Button
Use this button to set the POWERFUL mode. (▶ p.12)

INFORMATION Button
Use this button to select the operating mode. Every time you press this button, the mode will change from Ⓐ (AUTO) → ❄ (HEAT) → Ⓢ (DEHUMIDIFY) → ❄ (COOL) and → 🌿 (FAN) cyclically.

SILENT Button

(▶ p.16)

LEAVE HOME Button

Use this button to set the SILENT mode.(▶ p.13)

TIME >

⊕TIMER ON

DELETE

AUTO SWING (Vertical) Button

SLEEP TIMER Button Controls the angle of the horizontal air deflector. (► p. 11)

SLEEP TIMER Button

Use this button to set the sleep timer. (► p.18)

WEEKLY TIMER setting Buttons

ON / OFF TIMER setting Buttons



MODE	MODE SELECTOR
	AUTO
	HEAT
	DEHUMIDIFY
	COOL
	FAN
FAN SPEED	
	AUTO
	SILENT
	LOW
	MED
	HI
	START / STOP
	ECO

	FAN
	POWERFUL
	SILENT
	INFO
	SLEEP TIMER
	AUTO SWING (VERTICAL)
	LEAVE HOME
	CLEAN
	DAY
	PROGRAM NO.
1 - 6	

OFF ⊗ TIMER ON	ON / OFF TIMER
⌞ TIME ⌟	TIME
OK	OK
DELETE	DELETE
COPY/PASTE	COPY / PASTE
CANCEL	CANCEL
SEND	SEND
□ 0000	CLOCK

Precautions for Use

- Do not put the remote controller in the following places.
 - Under direct sunlight.
 - In the vicinity of a heater.
- Handle the remote controller carefully. Do not drop it on the floor, and protect it from water. Once the outdoor unit stops, it will not restart for about 3 minutes (unless you turn the power switch off and on or unplug the power cord and plug it in again). This is to protect the device and does not indicate a failure.
- If you press the MODE selector button during operation, the device may stop for about 3 minutes for protection.

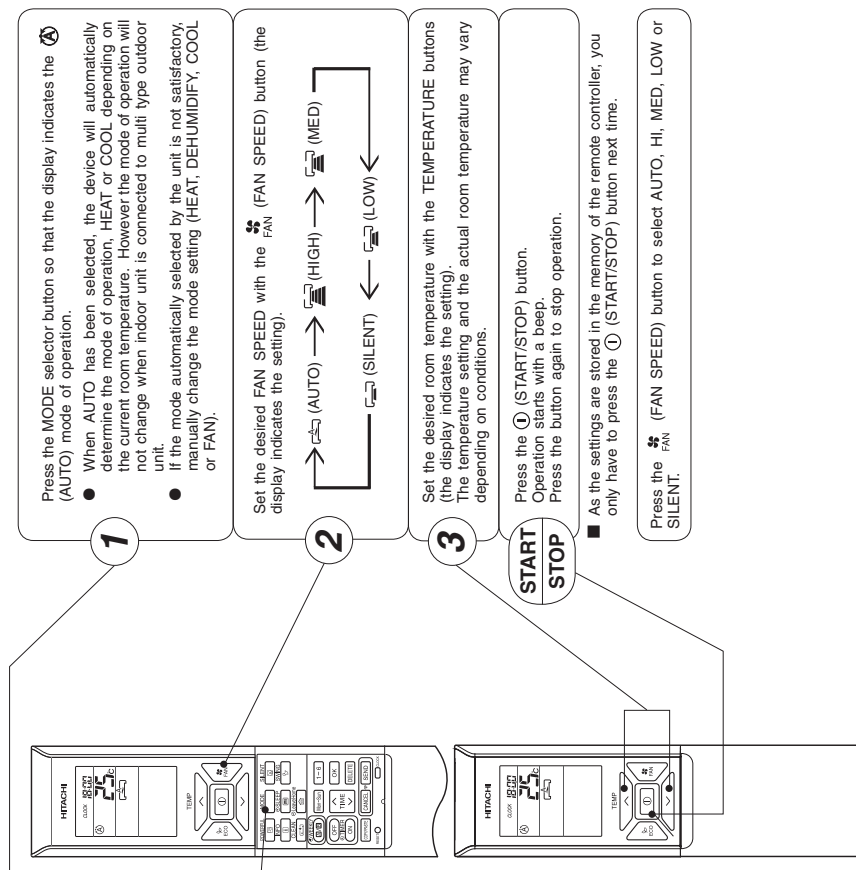
VARIOUS FUNCTIONS

Auto Restart Control

- If there is a power failure, operation will be automatically restarted when the power is resumed with previous operation mode and airflow direction.
- (As the operation is not stopped by remote controller.)
- If you intend not to continue the operation when the power is resumed, switch off the power supply. When you switch on the circuit breaker, the operation will be automatically restarted with previous operation mode and air flow direction.
- Note:**
1. If you do not require Auto Restart Control, please consult your sales agent.
 2. Auto Restart Control is not available when Timer or Sleep Timer mode is set.

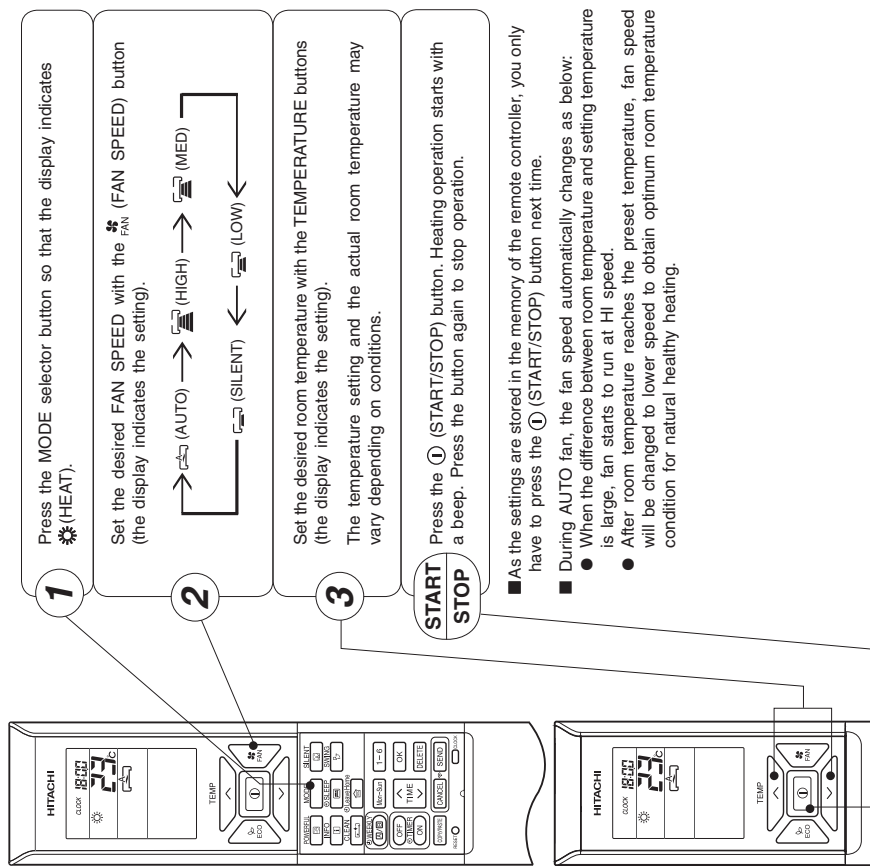
AUTOMATIC OPERATION

The device will automatically determine the mode of operation, HEAT or COOL depending on the current room temperature. The selected mode of operation will change when the room temperature varies. However, the mode of operation will not change when indoor unit is connected to multi type outdoor unit.



HEATING OPERATION

- Use the device for heating when the outdoor temperature is under 21°C. When it is too warm (over 21°C), the heating function may not work in order to protect the device.
- In order to maintain reliability of the device, please use this device when outdoor temperature is above -20°C.

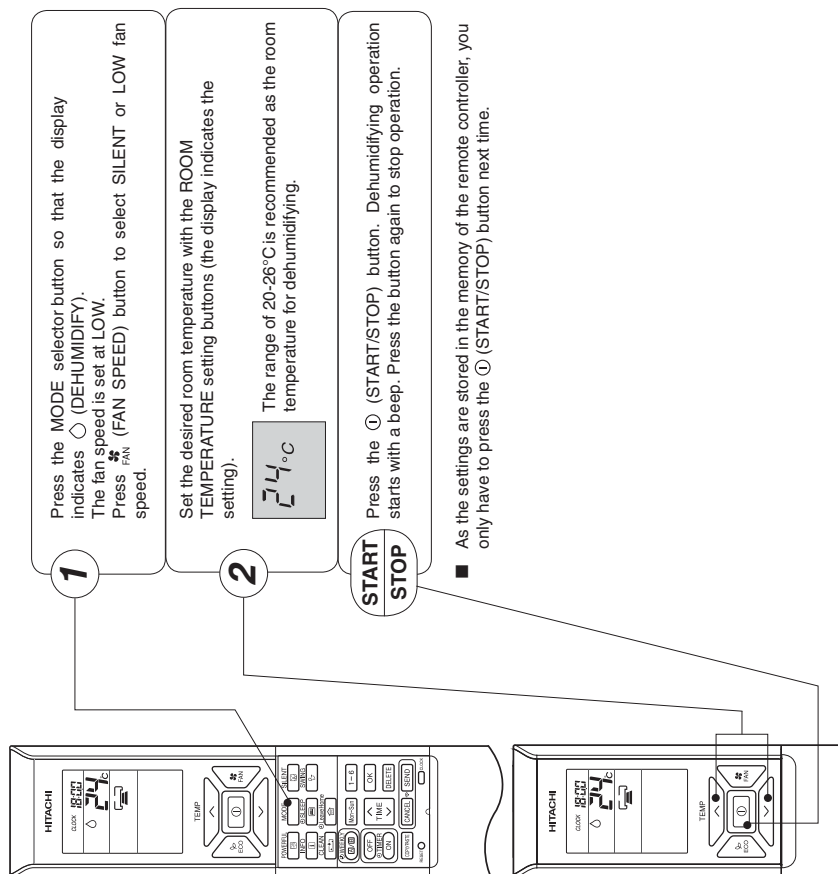


■ Defrosting

Defrosting will be performed about once an hour when frost forms on the heat exchange of the outdoor unit, for 5-10 minutes each time.
 During defrosting operation, the operation lamp blinks in a cycle of 3 seconds on and 0.5 second off.
 The maximum time for defrosting is 20 minutes.
 However, if the indoor unit is connected to multi type outdoor unit, the maximum time for defrosting is 15 minutes.
 (If the piping length used is longer than usual, frost is likely to form.)

DEHUMIDIFYING OPERATION

Use the device for dehumidifying when the room temperature is over 16°C. When it is under 15°C, the dehumidifying function will not work.

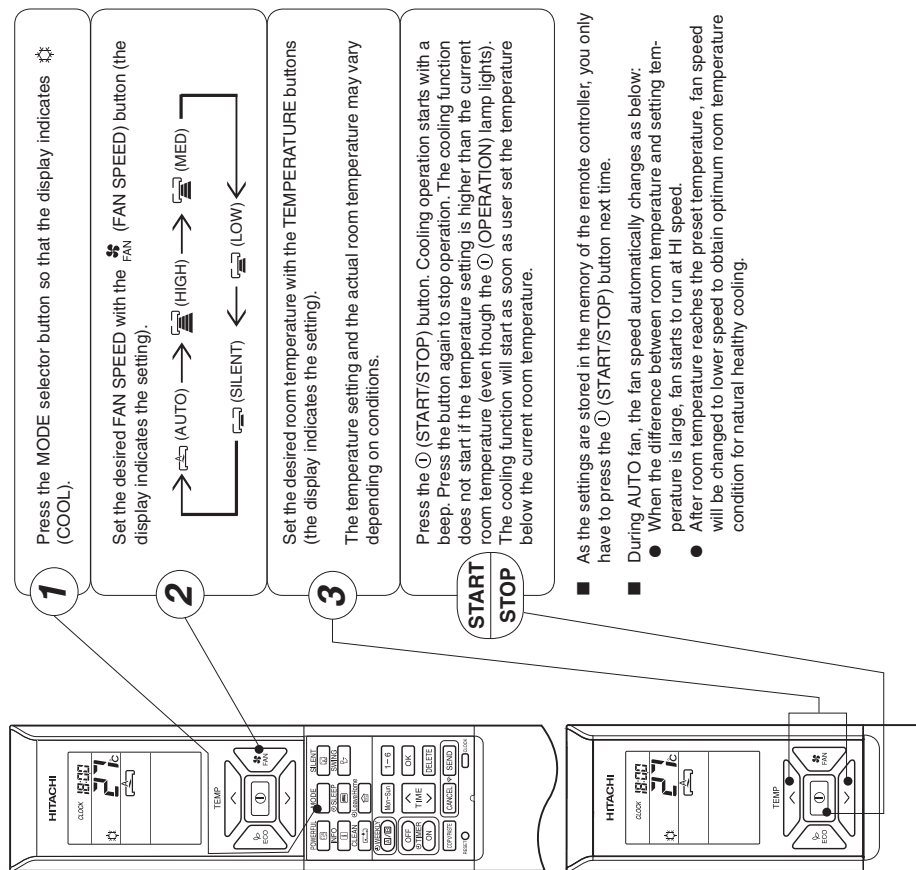


■ Dehumidifying Function

- When the room temperature is higher than the temperature setting. The device will dehumidify the room, reducing the room temperature to the preset level.
 When the room temperature is lower than the temperature setting: Dehumidifying will be performed at the temperature setting slightly lower than the current room temperature, regardless of the temperature setting.
- The preset room temperature may not be reached depending on the number of people present in the room or other room conditions.

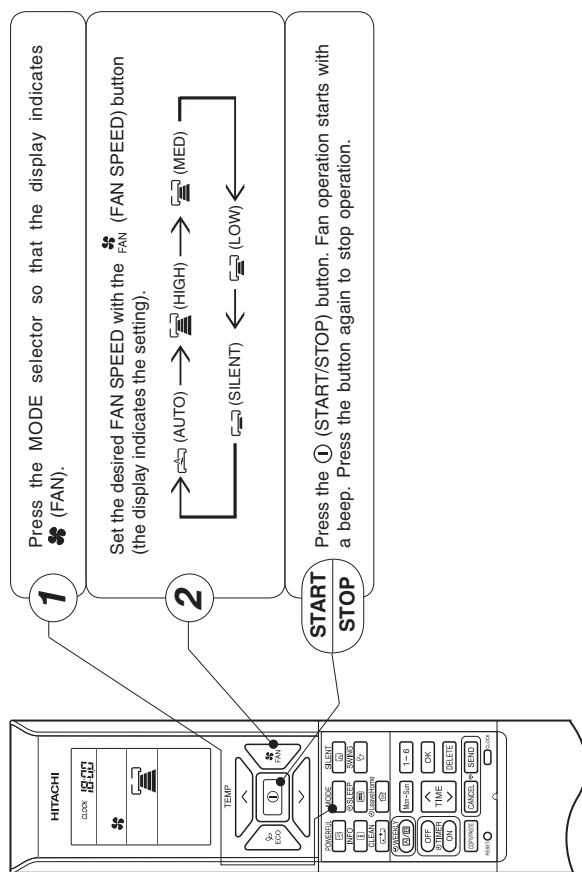
COOLING OPERATION

Use the device for cooling when the outdoor temperature is $-10 \sim 43^{\circ}\text{C}$.
If indoors humidity is very high (80%), some dew may form on the air outlet grille of the indoor unit.



FAN OPERATION

User can use the device simply as an air circulator.



AUTO SWING OPERATION

To start Vertical Auto Swing

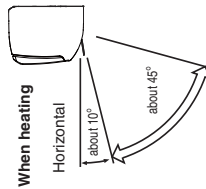
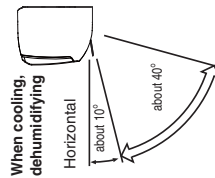
- Press **(V)** (AUTO SWING (VERTICAL)) button. The deflector(s) will start to swing up and down. **(V)** is displayed on the LCD.

To cancel Vertical Auto Swing

- Press **(V)** (AUTO SWING (VERTICAL)) button again. The deflector(s) will stop in the current position. **(V)** disappeared from the LCD.

NOTE

- During cooling and dehumidifying operation, do not keep the deflectors swinging or in the lower position (in the case of vertical auto swing) for a long time. It may cause dew condensation on the deflectors.



CAUTION

- When operating the unit in cooling operation with the air deflector facing down and moving automatically for a long period of time, water will be condensed on the air deflector and drips down occasionally. This will wet your furniture.

POWERFUL OPERATION

- By pressing **(P)** (POWERFUL) button during AUTO, HEATING, DEHUMIDIFYING, COOLING or FAN operation, the air conditioner performs at the maximum power.
- During POWERFUL operation, cooler or warmer air will be blown out from indoor unit for COOLING or HEATING operation respectively.

To start POWERFUL operation

- Press **(P)** (POWERFUL) button during operation.

"**(P)**" is displayed on the LCD.

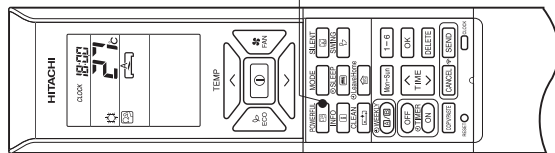
POWERFUL operation ends in 20 minutes. Then the system automatically operates with the previous settings used before POWERFUL operation.

To cancel POWERFUL operation

- Press **(1)** (START/ STOP) button. Or
- Press **(P)** (POWERFUL) button again.

POWERFUL operation stops.

"**(P)**" disappears from the LCD.

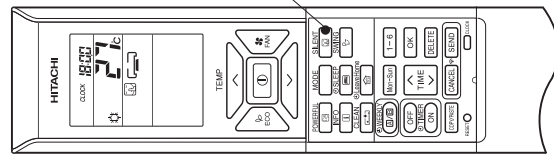


NOTE

- When SLEEP mode, ECO mode, SILENT mode or LEAVE HOME mode is selected, POWERFUL operation is cancelled.
- During POWERFUL operation, capacity of the air conditioner will not increase
 - if the air conditioner is already running at maximum capacity.
 - just before defrost operation (when the air conditioner is running in HEATING operation).
- After auto restart, POWERFUL operation is cancelled and previous operation shall start.
- For multi model connections, POWERFUL operation may not function depending on operation conditions.

SILENT OPERATION

- By pressing  (SILENT) button during AUTO, HEATING, DEHUMIDIFYING, COOLING or FAN operation, the fan speed will change to ultra slow.



To start SILENT operation

- Press  (SILENT) button during operation.
"  " is displayed on the LCD. Fan speed will be ultra slow.

To cancel SILENT operation

- Press  (START/STOP) button. Or
- Press  (SILENT) button again or  (FAN SPEED) button.
Fan speed will return to previous fan speed before SILENT operation starts.
SILENT operation stops.
"  " disappears from the LCD.

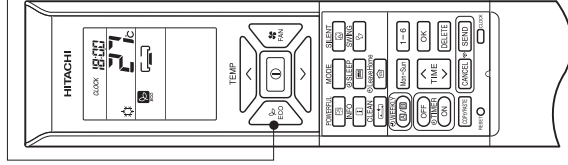
NOTE

- When POWERFUL operation is selected, SILENT operation is cancelled. Fan speed will return to previous fan speed before SILENT operation.
- After auto restart, SILENT operation is cancelled. Fan speed will return to previous fan speed before SILENT operation.
- During any operation with fan speed  (SILENT), if press  (SILENT) button, fan speed will not change.



ECO OPERATION

ECO operation is an energy saving function by changing set temperature automatically and by limiting the maximum power consumption value.



To start ECO operation

- By pressing the  (ECO) button during AUTO, HEATING, DEHUMIDIFYING or COOLING operation, the air conditioner performs the "ECO" operation.

- Press  (ECO) button during operation.

"  " is displayed on the LCD.

Energy saving operation will start by changing the set temperature higher or lower automatically and reducing operation power consumption. This function may vary based on the connected outdoor unit.

To cancel ECO operation

- Press  (START/STOP) button. Or
- Press  (ECO) button again.
"  " disappears from the LCD.

NOTE

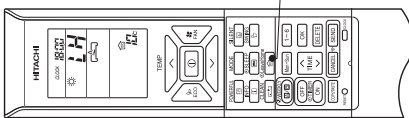
- ECO function will not be effective when power consumption is low.
- By pressing (POWERFUL) button, ECO operation is cancelled.
- After auto restart, ECO operation is cancelled and previous operation mode shall start.
- For multi model connections, energy saving operation shall only start by changing set temperature higher or lower automatically. However, effectiveness of ECO depends on operation conditions.

100°C LEAVE HOME(LH) OPERATION

Prevent the room temperature from falling too much by setting temperature 10°C automatically when no one is at home. This operation is able to operate by "Continuous operation" or "Day timer operation". Please use "Day timer operation" to set the number of days up to 99 days.

Continuous operation

■ To start LEAVE HOME operation



Option 1. Continuous operation.

- Press (LEAVE HOME) button during stop or operation.
Room temperature is set at 10°C and heating operation starts.
" " , " " , " " , " " is displayed on the LCD.

Option 2. Day timer operation.

- Press (LEAVE HOME) button during stop or operation.
Room temperature is set at 10°C and heating operation starts.
" " , " " , " " , " " is displayed on the LCD.
- Set number of operation days (1 to 99 days), if needed.

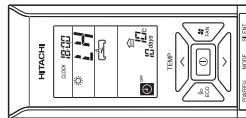
1

Press (TIME) button to select number of days.

Number of days blink.

- Press " " (UP)" to set number of days from 1 day, 2 days, 3 days 98 days, 99 days, 1 day and so on.
- Press " " (DOWN)" to set number of days from 99 days, 98 days, 97 days 3 days, 2 days, 1 day, 99 days and so on.
- Number of day is counted when clock indicates 0:00.
- Press (SEND) button to confirm number of operation days. Display for number of operation days will stop blinking.
- Press (CANCEL) button to reset number of operation days or to have continuous operation.

Day timer operation



■ To cancel LEAVE HOME operation

- Press (START/STOP) button.Or
- Press (LEAVE HOME) button again.
Return to previous operation mode (i.e.)
- Change to other operation mode by pressing (MODE) button.

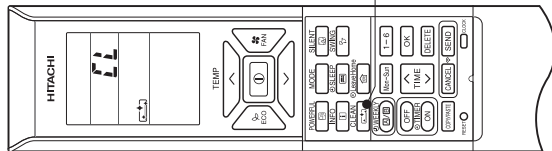
NOTE

- After reaching the set number of operation days for Leave Home or by pressing the (Leave Home) button again, the unit will operate in previous mode.
- During Leave Home operation, fan speed and horizontal air deflector position cannot be changed.
- By pressing (Leave Home) button, implementation of Weekly Timer or One Timer only Timer is cancelled.
- In case of power supply shut down, after autostart, all setting for number of days operation will be reset and unit shall be in continuous operation.
- For multi connections, when each room is running in different operation mode such as FAN only, COOLING, DEHUMIDIFYING or AUTO mode, Leave Home operation cannot operate even though it is possible to set Leave Home operation. In order to start Leave Home operation, all rooms must stop its operation. Then, press (LEAVE HOME) button to operate Leave Home operation.
- For multi connections, when all rooms are running HEATING operation, it is possible to operate Leave Home operation by pressing the (LEAVE HOME) button.
- For multi connections, if two or more rooms are set to operate Leave Home operation, the capability to reach the set temperature at 10°C may not be possible. In addition, this also depends on outdoor temperature.
- POWERFUL, SILENT and ECO operations are not applicable during Leave Home.

CLEAN (ONE TOUCH CLEAN) OPERATION

Drying indoor heat exchanger after cooling operation to prevent mildew.

■ To start CLEAN operation



- Press (CLEAN) button when unit is OFF.
Total time taken for One Touch Clean operation is 60 minutes.
During this operation, HEATING or FAN operation shall operate.
During one touch clean, operation lamp is blinking.

1

" " , " " is displayed on the LCD.

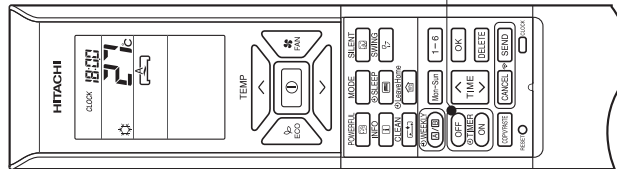
■ To cancel CLEAN operation

- Press (START/STOP) button.Or
- Press (CLEAN) button again.

NOTE

- When CLEAN operation finish, unit will switch OFF automatically.
- If Weekly Timer or Once Timer is set, there is a need to cancel those timer before operating CLEAN function.
- For multi connections, when pressing (CLEAN) button, operation is limited to FAN operation.
- For multi connections, when one room operates CLEAN operation first, other rooms can operate COOLING, DEHUMIDIFYING or FAN operation. However, when other rooms need to operate HEATING operation, air conditioner will be in STANDBY mode. After CLEAN operation finish, HEATING operation will start.

ONCE TIMER (ON/OFF TIMER) OPERATION



OFF TIMER

The device can be set to turn off at a preset time.

1. Press **OFF** (OFF-TIMER) button. **OFF** and **0:00** blink on the display.
 2. Set the "turn-off time" with **TIME** (TIME) button.
 3. After setting, direct the remote controller towards the indoor unit and press **SEND** (SEND) button.
- OFF** and "set time" lights up instead of blinking.
A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit lights up.

ON TIMER

When (ON TIMER) is set, the operation starts so that the preset temperature is reached at the preset time.

The air conditioner starts operation a maximum 60 minutes before the preset time, depending on conditions including room temperature and preset temperature.

1. Press **ON** (ON-TIMER) button. **ON** and **0:00** blink on the display.
 2. Set the "turn-on time" with **TIME** (TIME) button.
 3. After setting, direct the remote controller towards the indoor unit and press **SEND** (SEND) button.
- ON** and "set time" light up instead of blinking.
A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit lights up.

ON/OFF TIMER

- The device will turn on (off) and off (on) at the designated time.
- The switching occurs first at the preset time that comes earlier.
- The arrow mark appears on the display to indicate the sequence of switching operations.

1. Press **OFF** (OFF-TIMER) button so that **OFF** and **0:00** blink on the display.
 2. Set the "turn-off" time with **TIME** (TIME) button. After setting, direct the remote controller towards the indoor unit and press **SEND** (SEND) button.
 3. Press **ON** (ON-TIMER) button so that **ON** and "turn-off" time light up. The **ON** and **0:00** blink.
 4. Set the "turn-on" time with **TIME** (TIME) button.
 5. After setting, direct the remote controller towards the indoor unit and press **SEND** (SEND) button.
- ON** and set "turn-on" time light up instead of blinking.
A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit lights up.

■ The timer may be used in three ways: OFF-timer, ON-timer and ON/OFF (OFF/ON)-timer. Set the current time first because it serves as a reference.

■ To cancel Reservation

- Point the signal window of the remote controller towards the indoor unit and press **CANCEL** (CANCEL) button.
- **ON** and "ON or OFF set time" goes out with a beep and the (TIMER) lamp on the indoor unit turns off.

NOTE

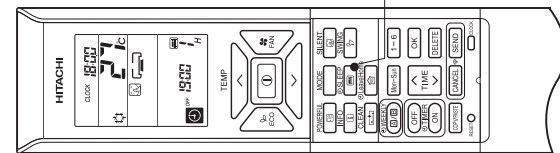
- User can set only one of the OFF-timer, ON-timer or ON/OFF-timer.
- If WEEKLY TIMER already set, by setting the ONCE TIMER, ONCE TIMER operation is prioritized. When ONCE TIMER operation is complete, WEEKLY TIMER operation will be activated.

ECO SLEEP TIMER OPERATION

The timer can be set up to a duration of 7 hours.

By pressing **ECO SLEEP** (SLEEP) button during AUTO, HEATING, DEHUMIDIFYING, COOLING or FAN operation, the unit shifts the room temperature and reduces the fan speed. It results in energy saving.

Set the current time first before operating the ECO SLEEP TIMER operation.



■ To start ECO SLEEP TIMER operation

Press **ECO SLEEP** (SLEEP) button during operation.

- "ECO", "OFF", "ON", "OFF", off time, "ECO" and number of hour are displayed on the remote controller display.
- During ECO SLEEP TIMER operation, fan speed will be ultra slow.
- A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit lights up.

Pressing **ECO SLEEP** (SLEEP) button repeatedly, the number of hours will change as below:



- During ECO SLEEP TIMER operation, air conditioner will continue to operate for the designated number of hours and then turn off.
- When the ECO SLEEP TIMER has been set, the display on the remote controller indicates the turn off time.



Example: If ECO SLEEP TIMER is set for 1 hour at 18:00, the switch off time will be at 19:00.

■ To cancel ECO SLEEP TIMER operation

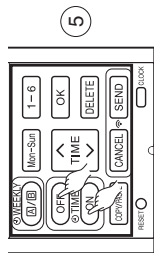
Press **START/STOP** button.

- Room air conditioner will switch off.

Press **ECO SLEEP** (SLEEP) button again until "ECO", "OFF", "ON", "OFF", off time, "ECO" and number of hour disappear from the remote controller display.

Press **CANCEL** (CANCEL) button.

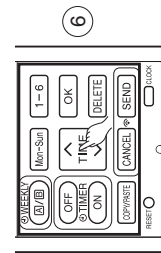
- A beep sound emitted from indoor unit and the (TIMER) lamp on the indoor unit turns off.
- SLEEP TIMER operation is cancelled.



5. Press **ON-OFF TIMER** button to select ON TIMER or OFF TIMER reservation.

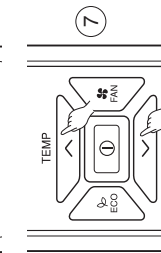
6. Press **TIME** button to set time reservation.

7. Press **TEMP** button to set temperature reservation.



8. Press **OK** button. The reservations are set. Day, program number, ON reservation, setting temperature will light up. will be continuously blinks. If reservation is not complete, settings will not be stored in memory.

To continue with the reservation, press **Mon-Sun** **1-6** **TIME** **ON** buttons. Follow step 3 to 8 for reservation.



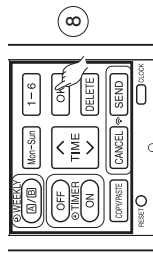
9. After all the reservations have been set, press **SEND** button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly.

After beep sound emitted from indoor unit, TIMER lamp will light up.

Please ensure that the TIMER lamp lights up.

This indicates that the reservation has been stored in the indoor unit and Timer function has been completed.

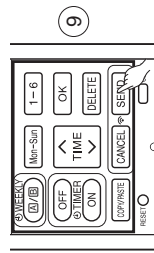
The reservation contents will appear on the remote controller display.



• If TIMER lamp on the indoor unit does not light up, press **SEND** button while directing the remote controller towards the indoor unit for about 3 seconds.

• **CAUTION !** Do not press **CANCEL** button during reservation setting because this will result in all reservation contents to be lost.

• The reservation contents will not stored in the indoor unit until **SEND** button has been pressed.



NOTE

- Up to 6 programs can be set per day. Setting ON TIMER or OFF TIMER for each program number will automatically arranged so that program number 1 shall have the earliest time and program number 6 shall have the latest time.
- If the setting time is the same, Priority will be given to the latest reservation contents.
- CAUTION !** If the remote controller is left idle and **SEND** button is not pressed within 3 minutes after reservations have been made, all current reservations will be lost.

Step 2: Select Mode A or Mode B and activate or deactivate WEEKLY TIMER.

■ How to select Mode A or Mode B of WEEKLY TIMER setting.

1. Press **WEEKLY** button. **A** and **B** blink on the display. (Normally Mode A will blink first).

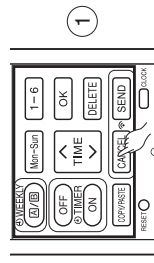
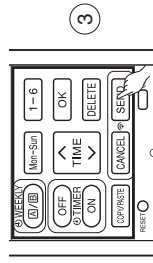
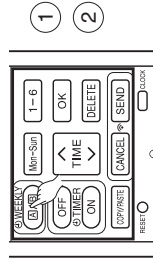
2. Press **WEEKLY** button again. **B** and **A** blink on the display.

3. Select Mode A or Mode B. Press **SEND** button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly.

After beep sound emitted from indoor unit, TIMER lamp will light up.

Please ensure that the TIMER lamp lights up.

This indicates that Mode A or Mode B selection and active WEEKLY TIMER have been confirmed.



■ Setting non-active WEEKLY TIMER .

1. Direct the remote controller towards the indoor unit and press **CANCEL** button.

Beep sound will be emitted from indoor unit and TIMER lamp will be OFF. Reservation indication on remote display will also disappear.

This indicates that non-active WEEKLY TIMER has been confirmed.

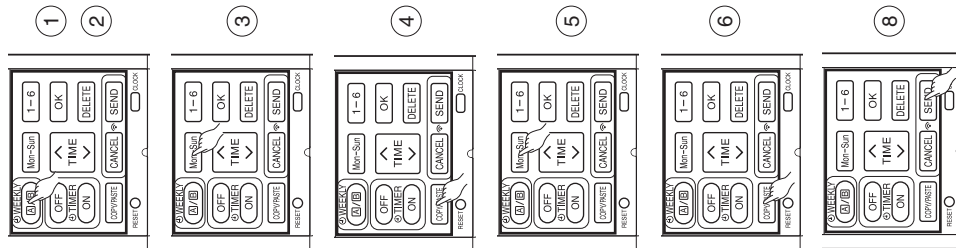
• To activate back the setting of WEEKLY TIMER, repeat the steps for "How to select Mode A or Mode B of WEEKLY TIMER setting".

NOTE

- When setting ONCE TIMER, operation of WEEKLY TIMER is interrupted. After ONCE TIMER operation is complete, WEEKLY TIMER operation will be activated.
- When ONCE TIMER is cancelled, operation of WEEKLY TIMER is also cancelled. Need to set WEEKLY TIMER operation for activation.
- After auto restart, WEEKLY TIMER operation is cancelled. Need to set WEEKLY TIMER operation for activation.

Step 3: Copy and cancel the reservation schedule.

- How to copy and paste.
Editing the reservation schedule is easy by copying data from one day to another day.
- 1. Press **WEEKLY** (WEEKLY) button to select Mode A or Mode B.
- 2. Press **WEEKLY** (WEEKLY) button for about 3 seconds to start editing the reservation schedule.
- 3. Press **Mon-Sun** (DAY) button to select a day of the week to copy.
- 4. Press **COPY/PASTE** (COPY/PASTE) button. Then "PASTE" blinks on the display.
* Press **CANCEL** (CANCEL) button to cancel the COPY mode. Normal setting mode is activated.
- 5. Press **Mon-Sun** (DAY) button to select a day of the week to paste.
- 6. Press **COPY/PASTE** (COPY/PASTE) button one more time to paste. **OK** only blinks on the display.
- 7. To continue copying to other days, press **Mon-Sun** or **1-6** or **TIME** or **LOCK**.

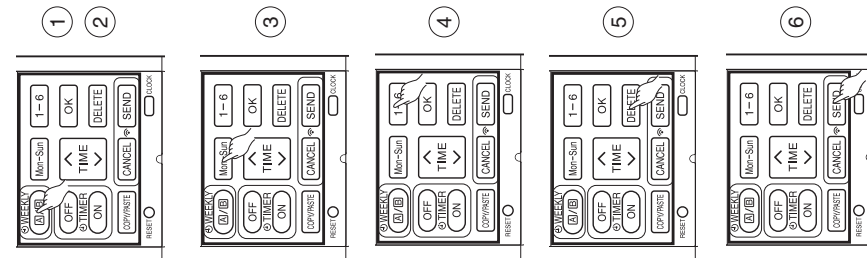


NOTE

- If there is no reservation data, copying data from one day to another day cannot be done.

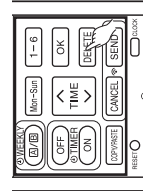
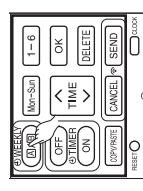
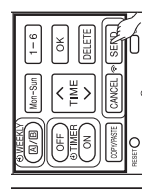
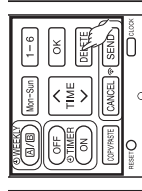
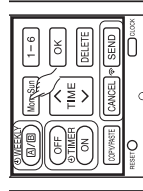
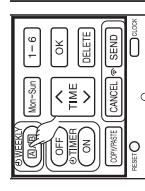
Step 3: Copy and cancel the reservation schedule.

- How to delete WEEKLY TIMER data.
[Delete one program number reservation]
- 1. Press **WEEKLY** (WEEKLY) button to select Mode A or Mode B.
- 2. Press **WEEKLY** (WEEKLY) button for 3 seconds to start editing the reservation schedule.
- 3. Press **Mon-Sun** (DAY) button to select a day of the week to edit.
- 4. Press **1-6** to select program number. Selected program number will blink.
- 5. Press **DELETE** (DELETE) button. Reservation of selected program number is deleted.
- 6. After deleting, press **SEND** (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly.
After beep sound emitted from indoor unit, **TIMER lamp** will light up.
Please ensure that the TIMER lamp lights up.
- Reservation will not change if **SEND** (SEND) button is not pressed.



WEEKLY TIMER OPERATION

Step 3: Copy and cancel the reservation schedule.



- [Delete one day reservation]
1. Press **WEEKLY** (WEEKLY) button to select Mode A or Mode B.
 2. Press **WEEKLY** (WEEKLY) button for 3 seconds to start editing the reservation schedule.
 3. Press **Mon-Sun** (DAY) button to select a day of the week to edit.
 4. Press **DELETE** (DELETE) button for about 10 seconds. Reservations for all program numbers will be deleted.
 - If press for a short time, reservation for one program number will be deleted.
 5. After deleting, press **SEND** (SEND) button while directing the remote controller towards the indoor unit for about 3 seconds. Timer lamp on the indoor unit will blink rapidly.
After beep sound emitted from indoor unit, **TIMER lamp** will light up.
Please ensure that the TIMER lamp lights up.
 - Reservation will not change if **SEND** (SEND) button is not pressed.

[Delete Mode A or Mode B]

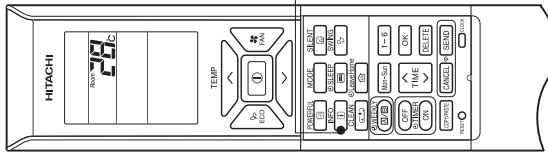
1. Press **WEEKLY** (WEEKLY) button to select Mode A or Mode B.
2. Direct the remote controller towards the indoor unit and press **DELETE** (DELETE) button for about 10 seconds while Mode A or Mode B display blinks.
After beep sound emitted from indoor unit, reservations for Mode A or Mode B will disappear.

NOTE

- If all reservations in the remote controller were deleted and pressed **SEND** (SEND) button, no signal will be transmitted to indoor unit. **TIMER lamp** will remain off and no changes will be done to the reservations stored in the indoor unit.

INFO FUNCTION

- By pressing **INFO** (INFO) button, temperature around remote controller and monthly power consumption will be displayed on the remote controller.
- After changing the batteries, direct the remote controller towards the indoor unit and press **INFO** (INFO) button.
Current calendar and clock will be transmitted from indoor unit.
- In order to receive information from indoor unit, the distance between remote controller and receiver of indoor units is within 2 meters.



■ To check temperature around remote controller

1. Press **INFO** (INFO) button.
Temperature will be displayed for 10 seconds.

■ To check monthly power consumption

Direct the remote controller towards the receiver of indoor unit (within 2 meters in front of indoor unit) and press **INFO** (INFO) button. Wait for 2 seconds for signal transmission.

While temperature around remote controller is displayed, press **INFO** (INFO) button repeatedly. The display will show as below:

this month power consumption amount for heating → last month power consumption amount for heating → this month power consumption amount for cooling → last month power consumption amount for cooling → temperature around remote control → this month power consumption amount for heating cyclically.

- If indication is not given, bring remote controller closer to the receiver of the indoor unit.
- Indicated value shall be regarded as a guide only.

■ Current calendar and clock can be retrieved from indoor unit

Direct the remote controller towards the receiver of indoor unit (within 2 meters in front of indoor unit) and press **INFO** (INFO) button. Wait for 2 seconds for signal transmission.

Once received the current calendar and clock, check whether they are correct or not by pressing **CLOCK** (CLOCK) button.

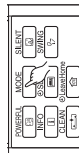
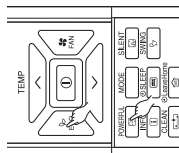
- If there is no power supply to indoor unit or calendar and clock have not been set, INFO function cannot be used for sending or receiving information.

NOTE

- In case failure occurs to the air conditioner, by pressing **INFO** (INFO) button, an error code will be displayed. Direct the remote controller towards the receiver of indoor unit (within 2 meters in front of indoor unit) and press **INFO** (INFO) button. Wait for 2 seconds for signal transmission.
An error code will be displayed. Call service center and inform the error code.
- Info Function to check monthly power consumption.
During installation, in case of power failure or breaker ON / OFF, ensure to set the clock and calendar for each indoor unit (unit in standby mode or auto restart), for single or multi connection, by pressing **START / STOP** button.
- Failure to do the above, monthly power consumption amount will not be displayed on the remote controller.

OPERATION MODE LOCK

The remote controller can be set to fix the HEATING mode (including FAN), COOLING mode (including FAN) and DEHUMIDIFYING mode (including FAN) operations.



- Method to lock HEATING mode (including FAN) operation.
- Press  (ECO) and  (POWERFUL) buttons simultaneously for about 5 seconds when remote controller is OFF.

This indicates that HEATING mode operation is locked.

When pressing (MODE) button, “” or “” will be displayed.

- Method to unlock HEATING mode (including FAN) operation.
- Press ECO and POWERFUL buttons simultaneously for about 5 seconds when the remote controller is OFF.
- All operation mode symbols will appear on the display for about 10 seconds. After that, operation mode symbol before cancellation will be displayed.
- This indicates that HEATING mode operation is unlocked.

- Method to lock COOLING and DEHUMIDIFYING modes (including FAN) operations.

Press  (ECO) and  (SILENT) buttons simultaneously for about 5 seconds when the remote controller is OFF.

“”, “”, “” and “” will be displayed for about 10 seconds. Later, “” and “” will remain.

This indicates that COOLING and DEHUMIDIFYING mode operation is locked.

When pressing (MODE) button, “ ”, “ ” or “ ” will be displayed.

- Method to unlock COOLING and DEHUMIDIFYING modes (including FAN) operations.

Press  (ECO) and  (SILENT) buttons simultaneously for about 5 seconds when the remote controller is OFF.

All operation mode symbols will appear on the display for about 10 seconds. After that, operation mode symbol before cancellation will be displayed.

This indicates that **COOLING** and **DEHUMIDIFYING** modes operation is unlocked.

NOTE

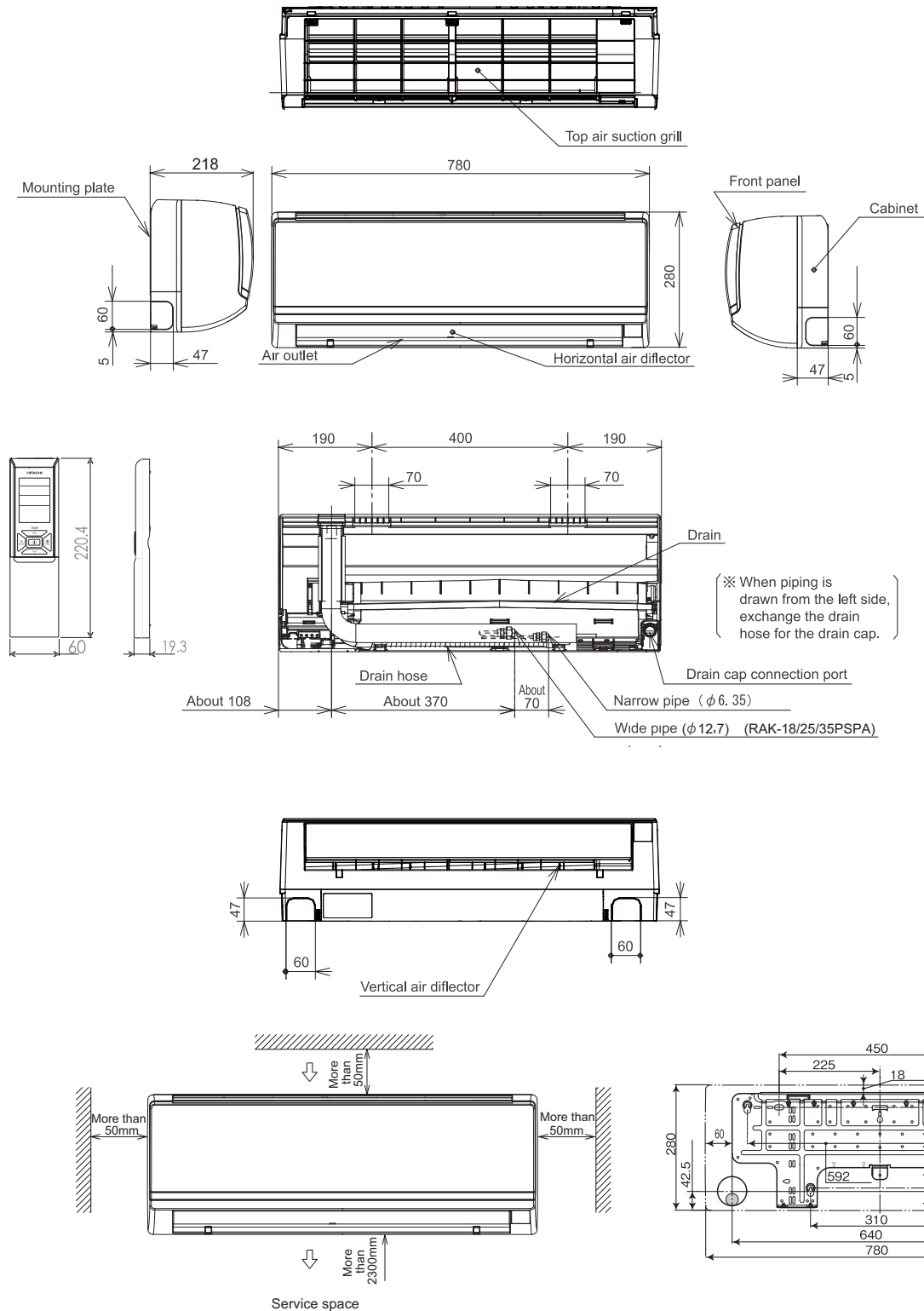
- Operation Mode Lock function will not activate if TIMER reservations activate.
- TIMER reservations shall be deactivated first. Then, Operation Mode Lock function can be activated. HEATING, COOLING and DEHUMIDIFYING mode (including FAN) operations can be unlocked by pressing the RESET (RESET) button. However, by pressing the RESET (RESET) button, all the information stored in the remote controller will disappear. You may need to set the necessary information again.
- For multi connections, unit and mode which is set to lock HEATING and switched on first shall have higher priority. Other units which are chosen to operate at different modes shall be in STANDBY until either the first unit operation is switched off or the mode is selected to be same as the first unit.

CONSTRUCTION AND DIMENSIONAL DIAGRAM

MODEL RAK-18PSPA,RAK-25PSPA,RAK-35PSPA

INDOOR UNIT

Unit : mm

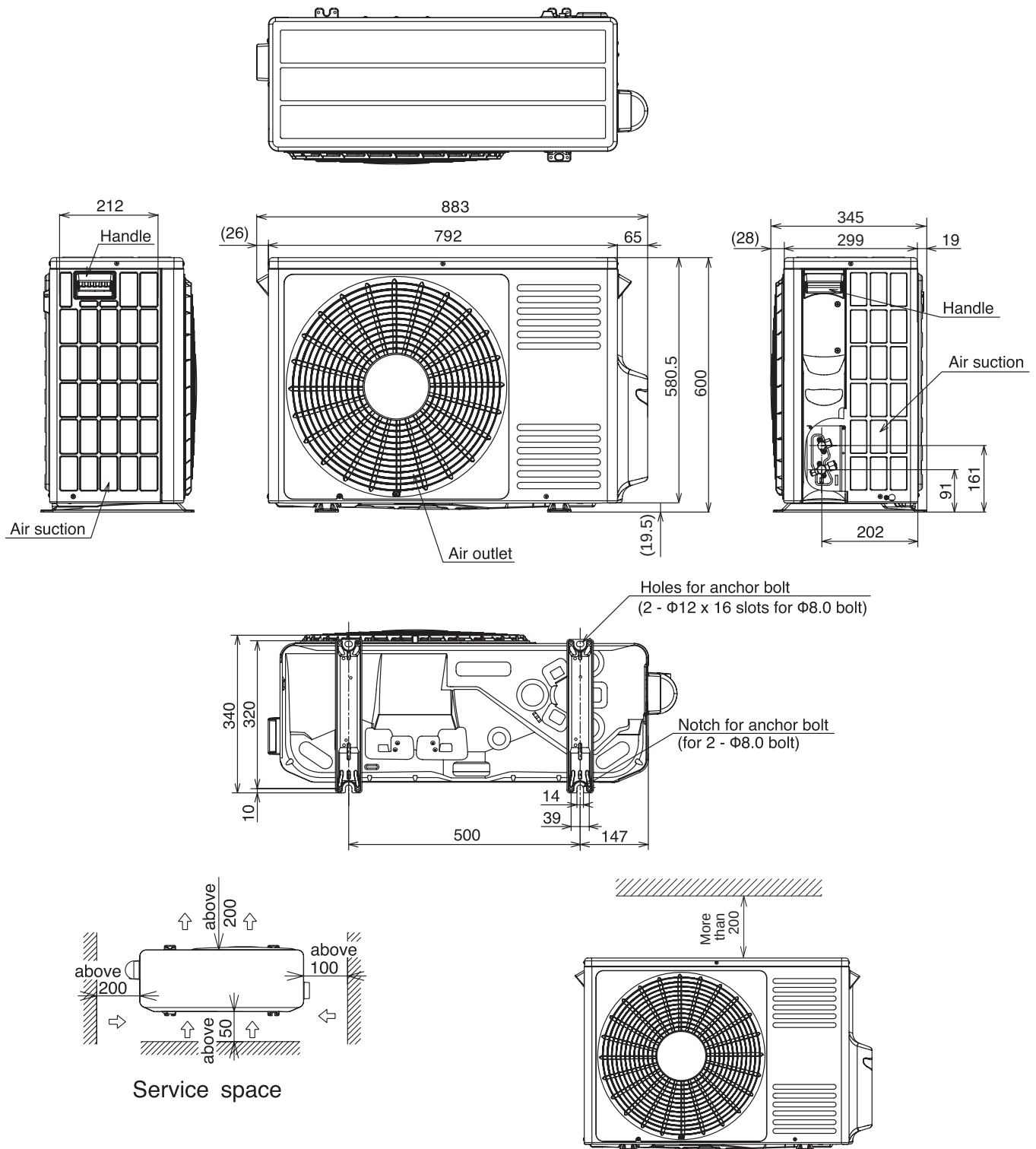


CONSTRUCTION AND DIMENSIONAL DIAGRAM

MODEL RAC-18/25/35WSPA

OUTDOOR UNIT

Unit : mm



NOTE:

1. For outdoor unit installation, allow at least (2) sides of space around the unit ensure ventilation flue.
2. The connecting pipe, should all the insulated with insulation pipe.
3. Piping length is within (20m).
4. Height different of the piping between the indoor unit and outdoor unit should be within (10m).

MAIN PARTS COMPONENT

THERMOSTAT (Room temperature Thermistor)

Thermostat Specifications

MODEL			RAK-18PSPA,RAK-25PSPA,RAK-35PSPA	
THERMOSTAT MODEL			IC	
OPERATION MODE			COOL	HEAT
TEMPERATURE °C (°F)	INDICATION 16	ON	15.3 (62.1)	16.7 (62.1)
		OFF	15.0 (60.8)	17.3 (63.1)
	INDICATION 24	ON	23.3 (76.5)	24.7 (76.5)
		OFF	23.0 (75.2)	25.3 (77.5)
	INDICATION 32	ON	31.3 (90.9)	32.7 (90.9)
		OFF	31.0 (89.6)	33.3 (91.9)

FAN MOTOR

Fan Motor Specifications

MODEL	RAK-18/25/35PSPA	RAC-18/25/35WSPA
POWER SOURCE	DC 35V	DC 120 - 380V
OUTPUT	25W	47W
CONNECTION	(Control circuit built in)	

BLU : BLUE
GRY : GRAY
BLK : BLACK

YEL : YELLOW
ORN : ORANGE
PNK : PINK

BRN : BROWN
GRN : GREEN
VIO : VIOLET

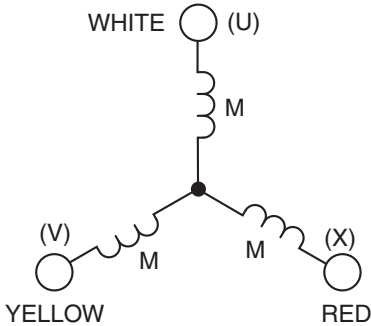
WHT : WHITE
RED : RED

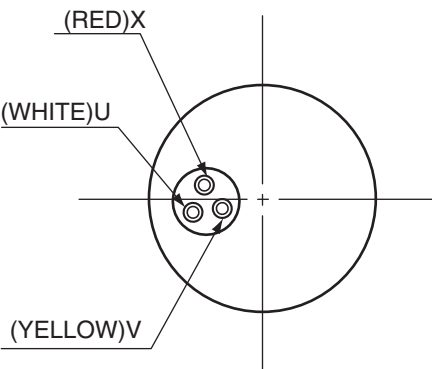
MAIN ELECTRIC COMPONENTS FOR OUTDOOR UNIT

NAME	RATING	APPLICABLE MODELS
REVERSING VALVE COIL	81.8 Ω (20 °C)	RAC-18/25/35WSPA
REACTOR	5.3 (mH), 67m Ω	RAC-18/25/35WSPA
FILM CAPACITOR	400 (μ F)	RAC-18/25/35WSPA

COMPRESSOR

Compressor Motor Specifications

MODEL		RAC-18WSPA,RAC-25WSPA,RAC-35WSPA	
COMPRESSOR MODEL		EU125XB2	
PUMP TYPE		SCROLL	
OUT PUT		1000W	
REFRIGERANT		R-410A	
APPROVED MOTOR VOLTAGE (DC VOLTAGE)		400V MAX	
CONNECTION			
RESISTANCE VALUE (Ω)	20°C (68°F)	U-V 2.23 V-X 2.23 U-X 2.23	
	75°C (167°F)	_____	



⚠ CAUTION

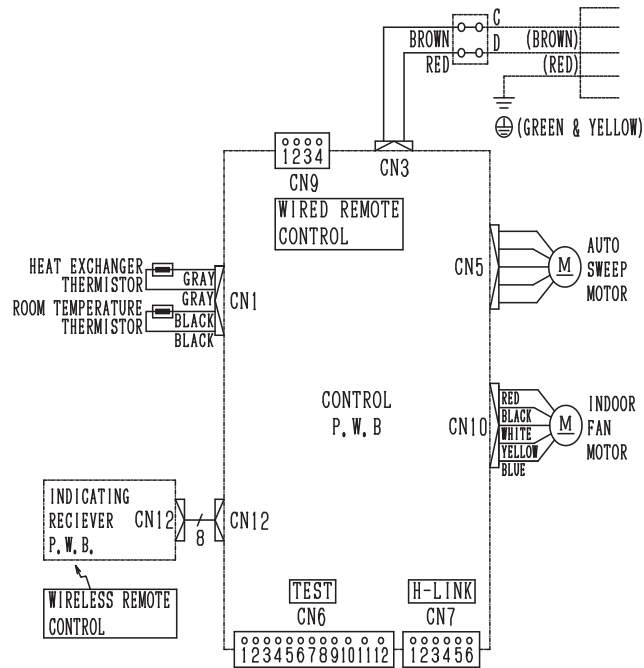
When the refrigerating cycle has been operated for a long time with the capillary tubes clogged or crushed or with too little refrigerant, check the color of the refrigerating machine oil inside the compressor. If the color has been changed conspicuously, replace the compressor.

WIRING DIAGRAM

MODEL RAK-18/25/35SPSA
RAC-18/25/35WSPA

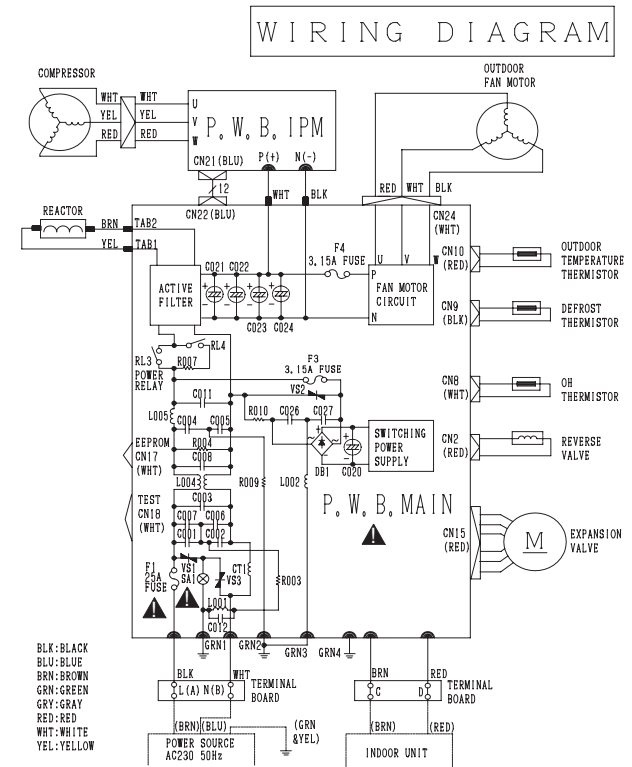
CAUTION
The marked parts  are
very important ones for safety.

INDOOR UNIT



WIRING DIAGRAM

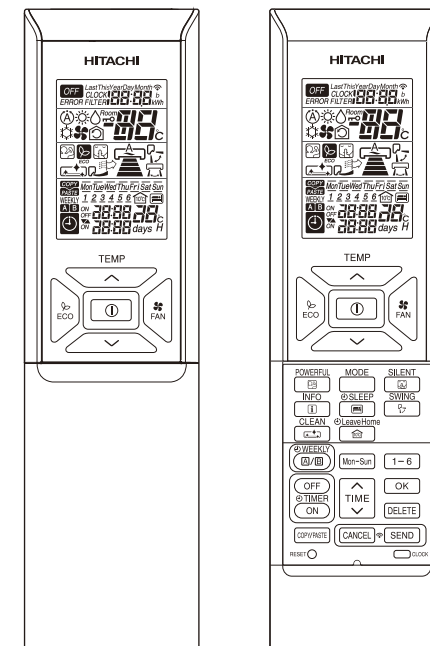
OUTDOOR UNIT



NOTE

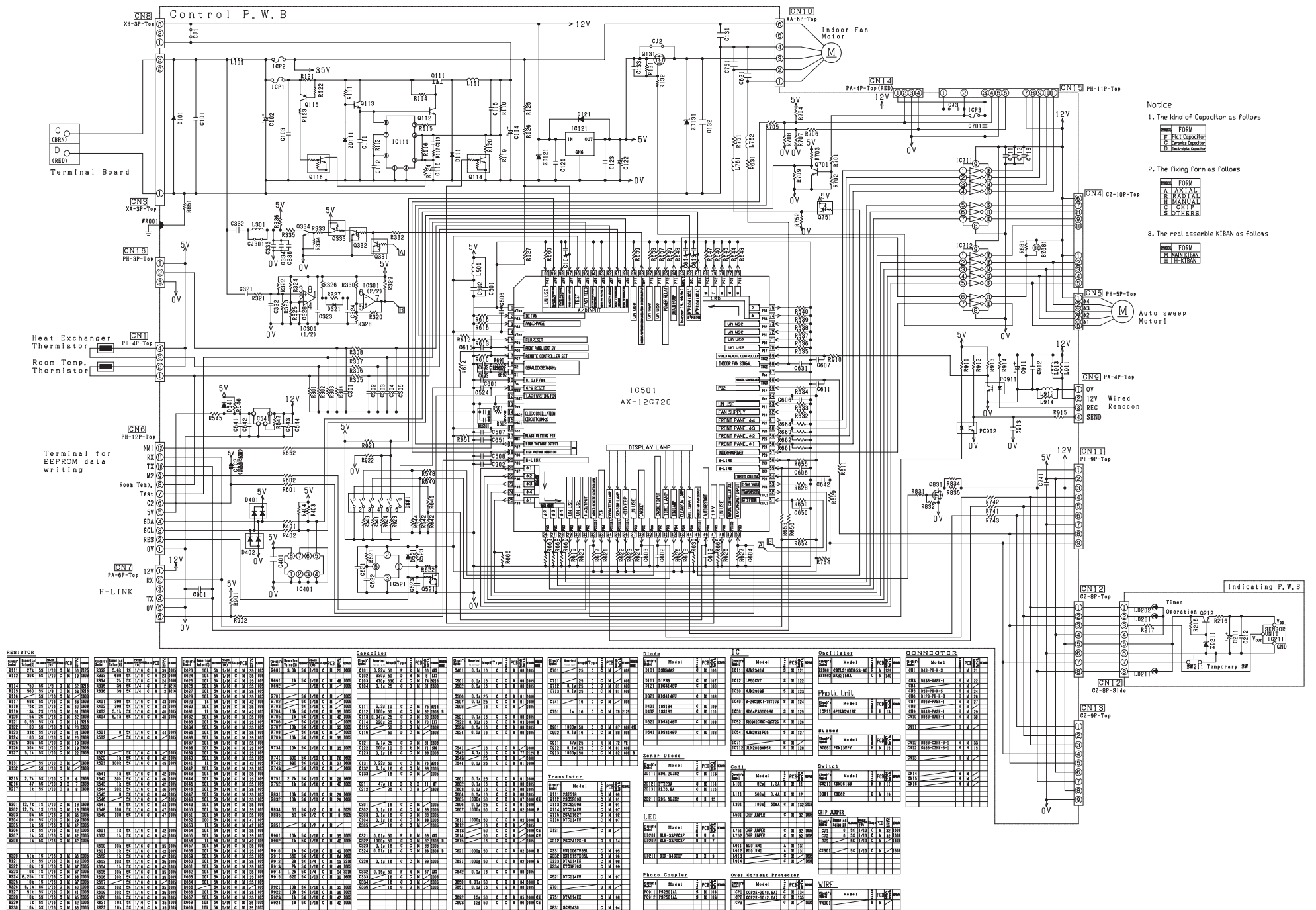
1.Connecting cable 1.5mm dia.x2 (C D line) is used for the connection.

[Remote controller] RAR-5E2



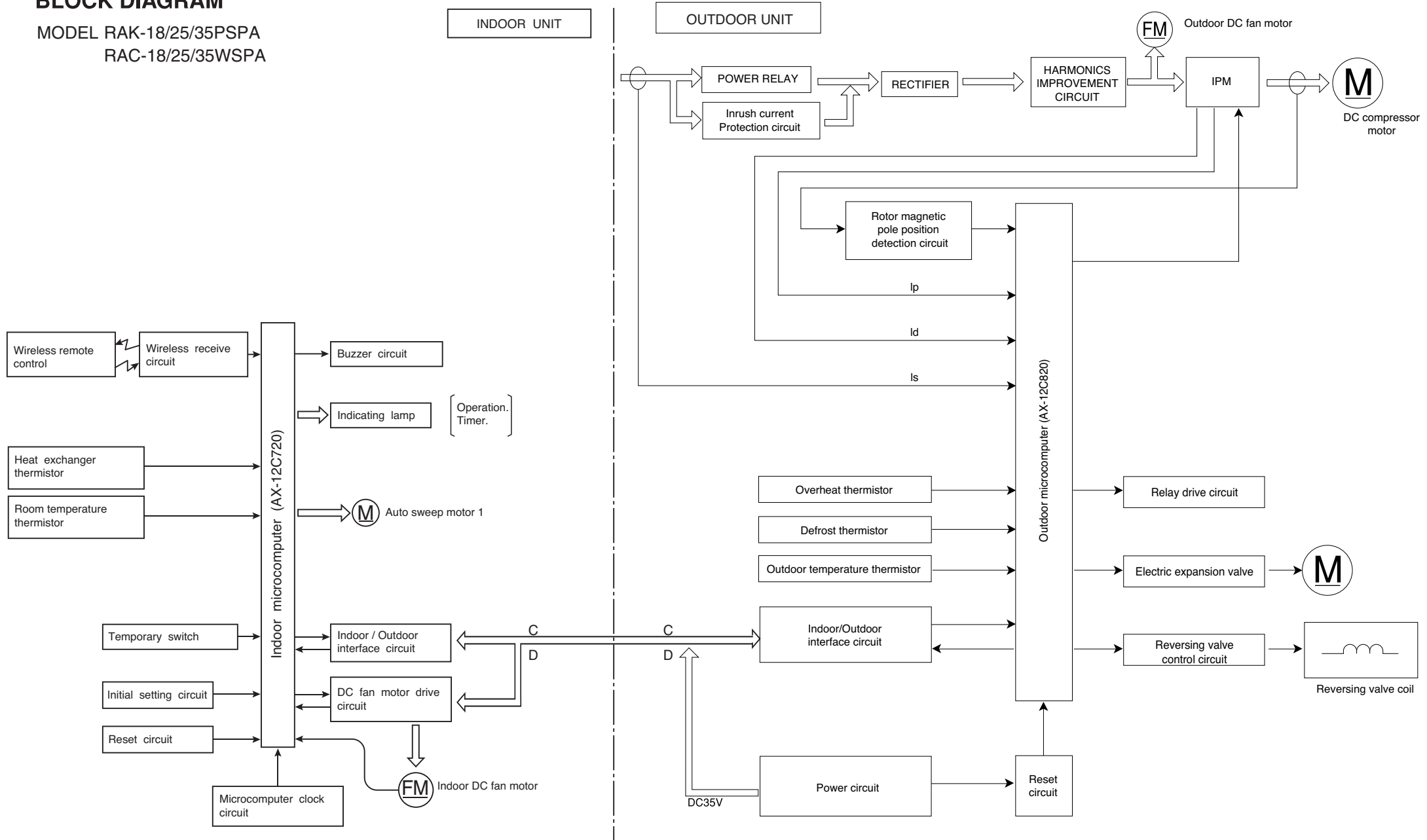
CIRCUIT DIAGRAM

MODEL RAK-18/25/35PSPA



BLOCK DIAGRAM

MODEL RAK-18/25/35PSPA
RAC-18/25/35WSPA



BASIC MODE

MODEL RAK-18/25/35PSPA

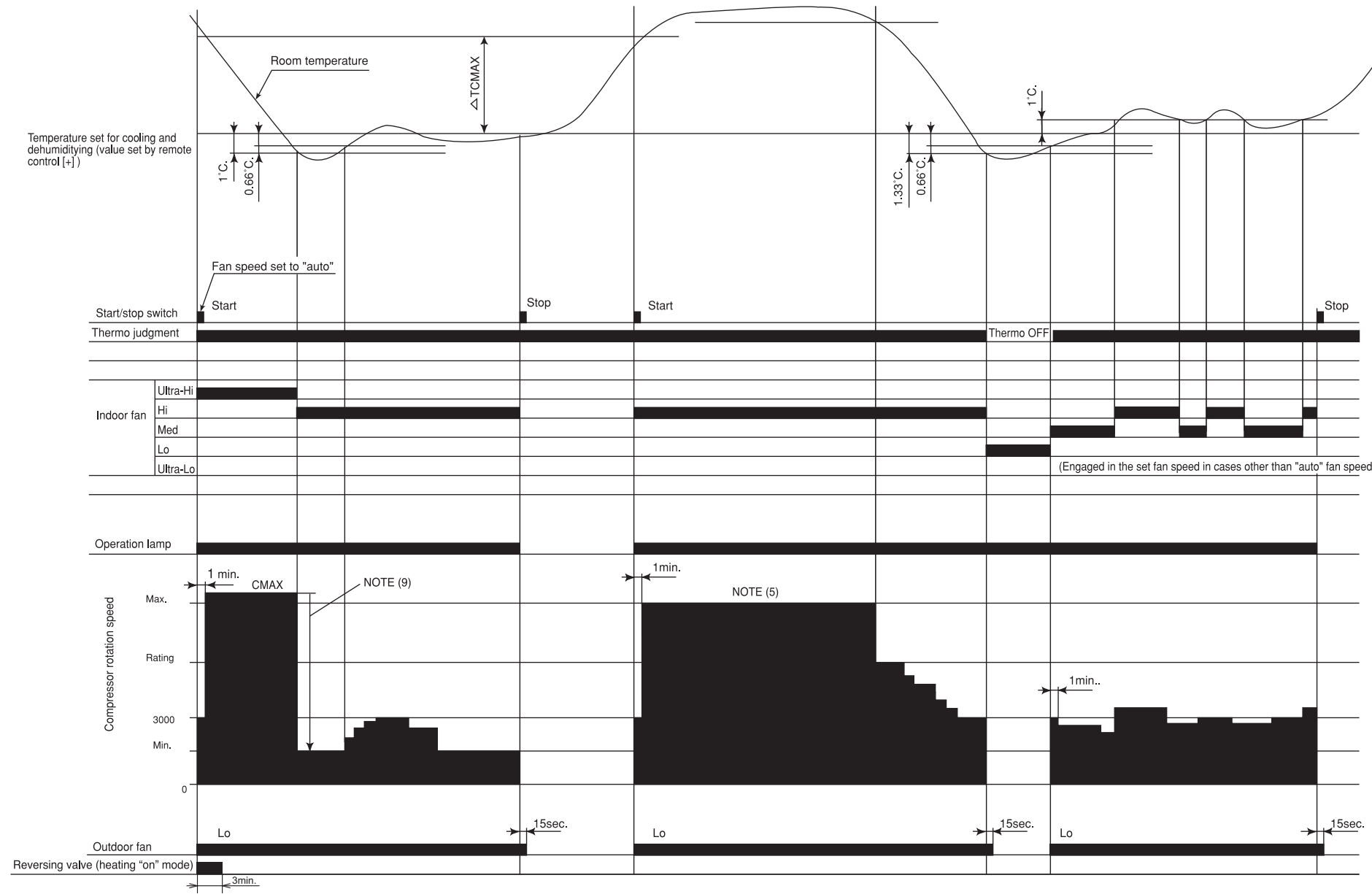
Operation mode		Fan	Cooling	Dehumidifying	Heating	Auto
Basic operation of start / stop switch		Start / stop switch Operation lamp Start Stop Start Stop				
Timer functions	Off-timer	Start / stop switch Reserve switch Cancel switch Operation lamp Timer lamp Timer memory (Off-timer during stop) (Change in reserved time)				
	On-timer	Start / stop switch Reserve switch Cancel switch Operation lamp Timer lamp Timer memory (Change in reserved time) (On-timer during operation)				
Fan speed mode (indoor fan)	Auto		Changes from "Hi" to "Med" or "Lo" depending on room temperature. Room temperature Temperature set for cooling Thermo judgment Compressor Hi Med Lo Silent 3' (Compressor stopped forcibly for 3 minutes) 1. Runs at "Hi" until first thermo off after operation is started. 2. Runs at "Lo" when thermo is off.		Set to "Silent", "Lo", "Med", "Hi", "ultra-Hi" or "stop" depending on the room temperature, time and heat exchange temperature. Set to "stop" if the room temperature is 18°C in the "Silent" mode other than during preheating (cooling is recovered at 18.33°C). When the compressor is running at maximum speed during hot dash or when recovered from defrosting. Heat exchanger temperature In modes other than left. 45 36 32 29 35.0 30.0 26.0 23.0 High or ultra-High (Fan speed set to "AUTO") Med Low Silent	Operating mode is judged by room temperature. (1) Judging by room temperature Operating mode at start up is judged (initial judgment). (a) Conditions for judgment (any of the followings). ·When auto operation is started after the previous auto mode operation. ·When auto operation is started after the previous manual mode operation. ·When the operating mode is switched to auto while operating at manual mode. (b) Judging method · [Cooling] : Room temperature $\geq$ Remote controller setting · [Heating] : Room temperature $<$ Remote controller setting [Room temperature setting of remote controller] Cooling Heating
	Hi	Operates at "Hi" regardless of the room temperature.	Set to "Ultra-Hi" when the compressor runs at maximum speed, and to "Hi" in other modes.		Set to "Silent", "Lo", "Med", "Hi", "Ultra-Hi" or "Stop" depending on the room temperature and time. Set to "Stop" if the room temperature is 18°C in the "Silent" mode other than during preheating (cooling is recovered at 18.33°C). Set to "Ultra-Hi" when the compressor is running at maximum speed during hot dash or when recovered from defrosting.	(2) Judging operating mode change during operation (Continuous judgment). (a) Conditions for judgment ·The mode is reviewed at interval time. *Interval time as below ·The first interval time : 10 minutes ·The second interval time : 15 minutes ·On and after the third interval time : 55 minutes (b) Judging method ·Judge by setting the hysteresis on the final preset temperature. The final preset temperature is the actually targeted preset temperature which is sum of basic preset temperature and each type of shift value. (e.g. preset temperature correction value, powerful shift value, eco shift value, eco sleep shift value, etc.) [Currently cooling] ·Room temperature $\geq$ Final preset temperature -3 Change to heating ·Room temperature $>$ Final preset temperature -3 Continue cooling [Currently heating] ·Room temperature $\geq$ Final preset temperature 2 Change to cooling ·Room temperature $<$ Final preset temperature 2 Continue heating -3 Heating final preset temperature +2 Cooling
	Med	Operates at "Med" regardless of the room temperature.	Same as at left.		Set to "Silent", "Lo", "Med" or "Stop" depending on the room temperature and time. Set to "Stop" if the room temperature is 18°C in the "Silent" mode other than during preheating (cooling is recovered at 18.33°C).	
	Lo	Operates at "Lo" regardless of the room temperature.	Same as at left.	Set to "Lo" in modes other than when the compressor stops.	Set to "Silent", "Lo", or "Stop" depending on the room temperature and time. Set to "Stop" if the room temperature is 18°C in the "Silent" mode other than during preheating (cooling is recovered at 18.33°C). The fan speed is controlled by the heat exchanger temperature; the overload control is executed as in the following diagram: KAFON KAFOF Heat exchanger temperature On Off On Off "Med" with overload "Lo"	
	Silent	Operates at "Silent" regardless of the room temperature.	Same as at left.	Set to "Silent" in modes other than when the compressor stops.		
Basic operation of temperature controller	Performs only fan operation at the set speed regardless of the room temperature.	See page 38.	See page 40.	See page 42.		
Sleep operation (with sleep button ON)	Enters sleep operation after set as on the left. Action during sleep operation silent (sleep) operation.	• Same as at left. • See page 40.	• Same as at left. • See page 40.	• Same as at left. • See page 42.		• Same as at left. • Performs the sleep operation of each operation mode.
Leave home				• See page 44.		

Notes:
1. The speed set of rotaion for the fan motor in each operation mode are as shown in Table 1.
2. The set room temperatures in the diagram include the shift values in Table 2.

Table 1 Mode data file

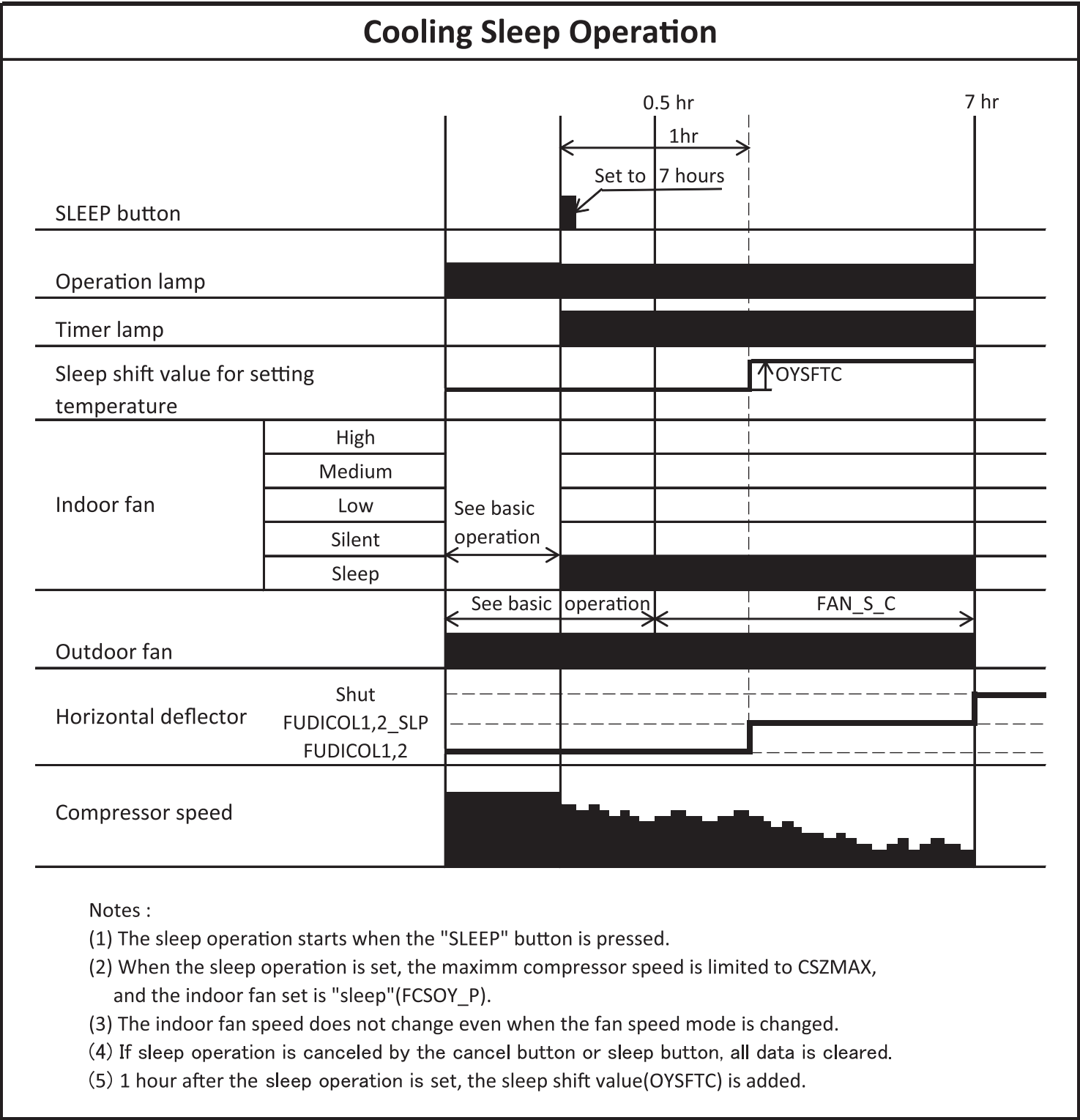
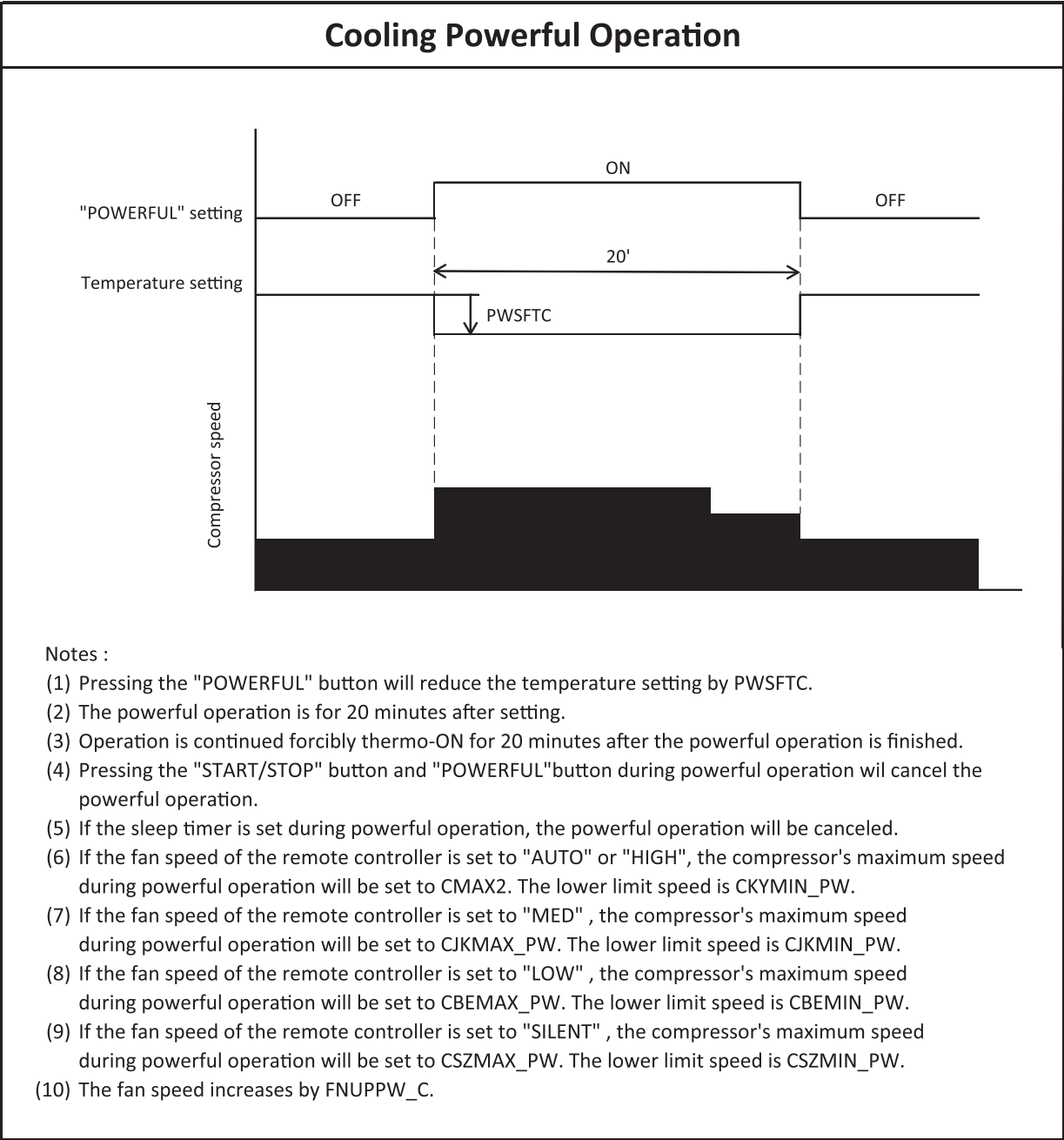
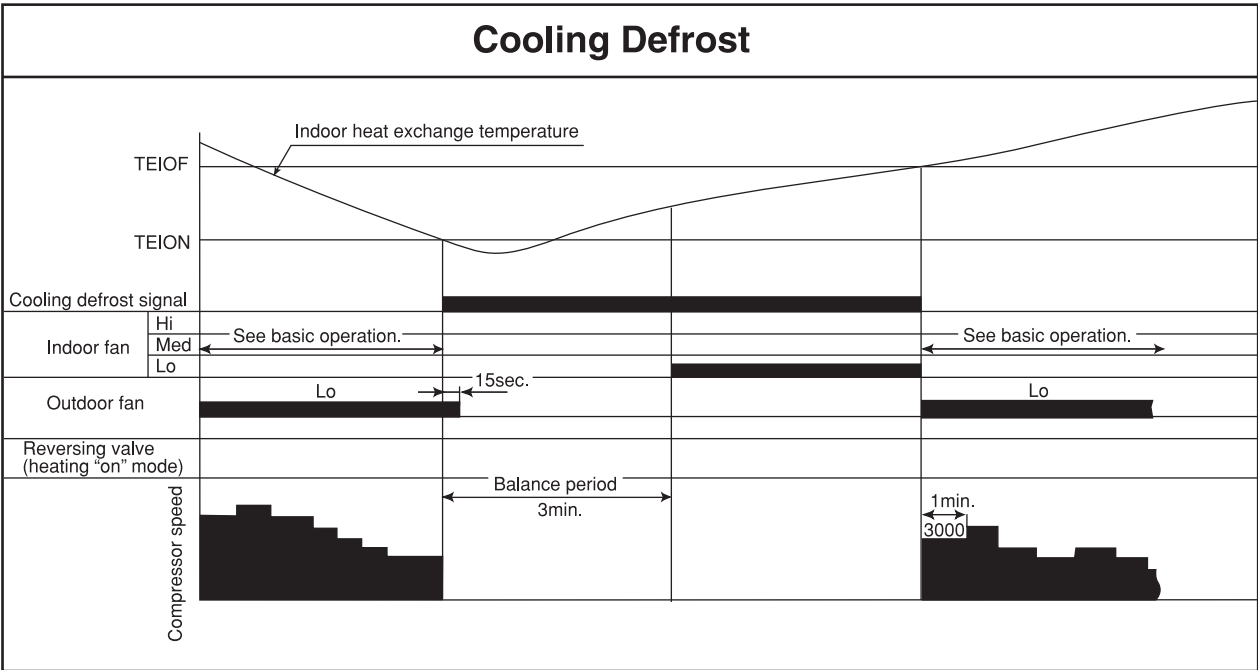
MODEL	RAK-18PSPA	RAK-25PSPA	RAK-35PSPA
LABEL NAME	VALUE		
WMAX	4400 min-1	5400 min-1	5700 min-1
WMAX2	4400 min-1	5400 min-1	5700 min-1
WSTD	2150 min-1	2900 min-1	3500 min-1
WJKMAX	2000 min-1	2600 min-1	3000 min-1
WBEMAX	1800 min-1	2400 min-1	2800 min-1
WSZMAX	1800 min-1	2200 min-1	2300 min-1
CMAX	2600 min-1	3100 min-1	4200 min-1
CMAX2	2600 min-1	3100 min-1	4200 min-1
CSTD	1700 min-1	2100 min-1	3050 min-1
CKYMAX	2700 min-1	2700 min-1	2700 min-1
CJKMAX	2500 min-1	2500 min-1	2500 min-1
CBEMAX	2200 min-1	2200 min-1	2200 min-1
CSZMAX	1700 min-1	1700 min-1	1700 min-1
WMIN	1100 min-1	1100 min-1	1100 min-1
CMIN	1100 min-1	1100 min-1	1100 min-1
STARTMC	90 Seconds	90 Seconds	90 Seconds
DWNRATEW	80%	80%	80%
DWNRATEC	70%	70%	70%
SHIFTW	1.00°C	1.00°C	1.00°C
SHIFTC	1.33°C	1.33°C	1.33°C
CLMXTP	30.00°C	30.00°C	30.00°C
TEION	4.00°C	4.00°C	4.00°C
TEIOF	9.00°C	9.00°C	9.00°C
SFTDSW	1.00°C	1.00°C	1.00°C
DFTIM-OTP0	50 Minutes	50 Minutes	60 Minutes
DFTIM-OTP5	60 Minutes	60 Minutes	90 Minutes
DFTIM-OTP10	60 Minutes	60 Minutes	90 Minutes

Basic Cooling Operation

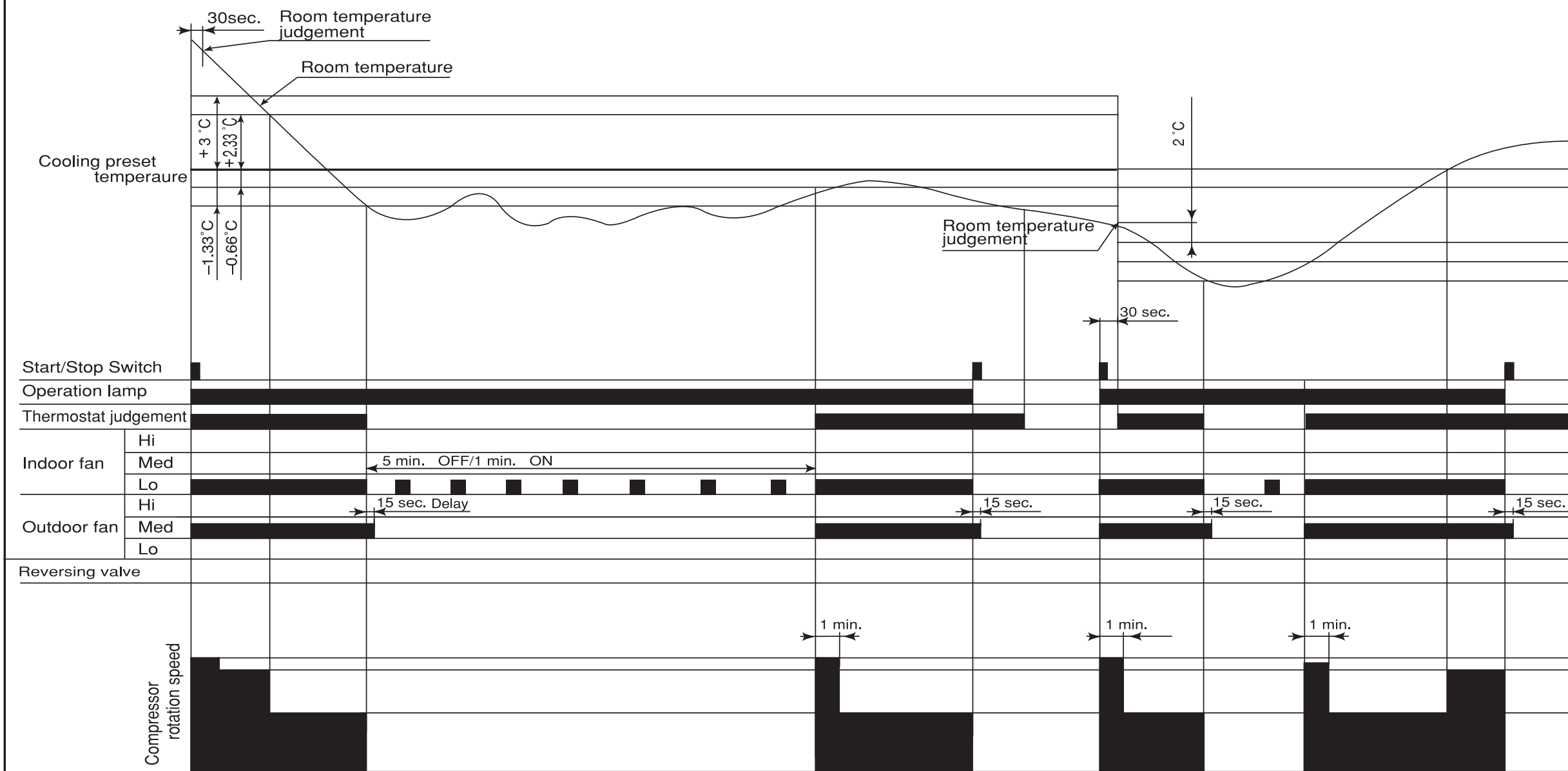


Notes:

- (1) Condition for entering into Cool Dashed mode. When fan set to "Hi" or "Auto" and when the compressor speed (P section) due to temperature difference between setting temperature (including the correction shift only) and room temperature is CMAX or higher.
- (2) Cool Dashed will release when i) a maximum 25 minutes is lapsed and ii) room temperature is lower than set temperature -3°C (thermo off) and iii) when room temperature has achieved setting temperature -1°C then maximum Cool Dashed time will be revised to 20 minutes. And iv) indoor fan is set to Lo and Med fan mode and v) change operation mode.
- (3) During Cool Dashed operation, thermo off temperature is set temperature (with shift value) -3°C . After thermo off, operation continues in Fuzzy control mode.
- (4) Compressor minimum "ON" time and "OFF" time is 3 minutes.
- (5) During normal cooling mode, compressor maximum rpm CMAX will maintain for 60 minutes if indoor temperature is lower than CLMXTP. No time constrain if indoor temperature is higher than CLMXTP.
- (6) When fan is set to "Hi", compressor rpm will be limited to CSTD.
- (7) When fan is set to "Med", compressor rpm will be limited to CJKMAX.
- (8) When fan is set to "Lo", compressor rpm will be limited to CBEMAX.
- (9) During Cool Dashed, when room temperature reaches set temperature -1°C compressor rpm is actual rpm x DWNRATEC.



Dehumidifying



- Notes:**
- (1) If the room temperature is (cooling preset temperature) - (1.33°C) or less after 30 seconds from starting the operation, the operation is done assuming as the preset temperature = (room temperature at the time) - (2°C).
 - (2) The indoor fan is operated in the "Lo" mode. During thermo OFF indoor fan will be OFF for 5 minutes and ON for 1 minute.
 - (3) When the operation is started by the thermostat turning ON, the start of the indoor fan is delayed 32 seconds after the start of compressor operation.
 - (4) The compressor is operated forcedly for 3 minutes after operation is started.
 - (5) The minimum ON time and OFF time of the compressor are 3 minutes.

Dehumidifying Sleep Operation		
0.5 hr 1hr 7 hr		
SLEEP button		
Operation lamp		
Timer lamp		
Sleep shift value for setting temperature		
Indoor fan	High	
	Medium	
	Low	
	Silent	
	Sleep	
Outdoor fan		
Horizontal deflector	Shut FUDIDRY1,2_SLP FUDIDRY1,2	
Compressor speed		

Notes :

- (1) The sleep operation starts when the "SLEEP" button is pressed.
- (2) When the sleep operation is set, the indoor fan set is "sleep"(FDOY_P).
- (3) The indoor fan speed does not change even when the fan speed mode is changed.
- (4) If sleep operation is canceled by the cancel button or sleep button, all data is cleared.
- (5) 1 hour after the sleep operation is set, the sleep shift value(OYSFTSD) is added.

Dehumidifying Powerful Operation

The diagram illustrates the timing of the dehumidifying powerful operation. It consists of three horizontal timelines:

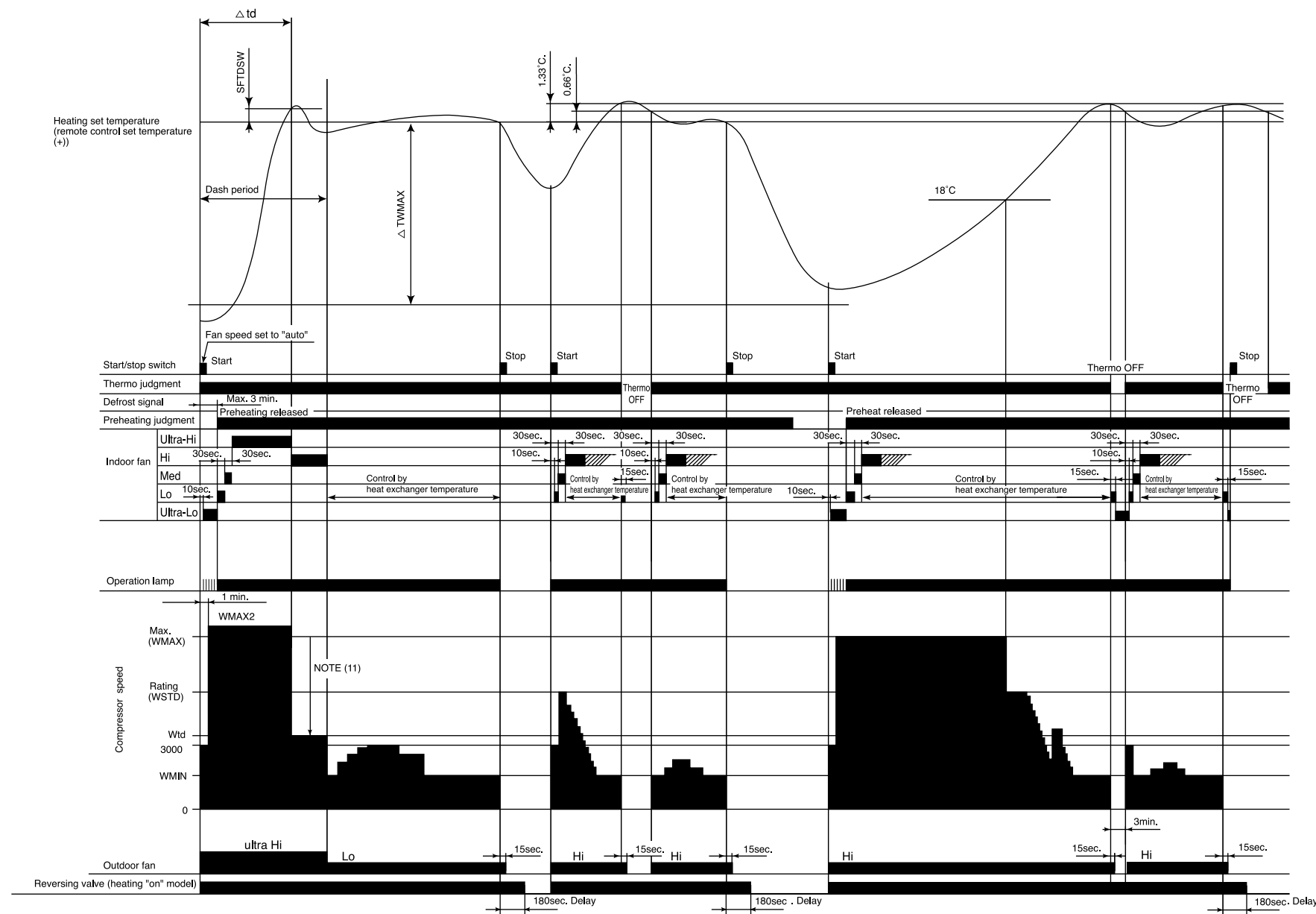
- "POWERFUL" setting:** Starts at OFF, transitions to ON at the start of the powerful operation, and returns to OFF at the end of the 20-minute period.
- Temperature setting:** Remains constant until the powerful operation begins, then drops by a value labeled PWSFTSD (Powerful Setting Temperature Shift) and remains at this lower level for the 20-minute duration.
- Compressor speed:** Operates at a baseline speed labeled SDRPM. When the powerful operation starts, the speed increases to a higher level labeled SDMAX. After the 20-minute period ends, it returns to the SDRPM level.

Vertical dashed lines mark the beginning and end of the 20-minute powerful operation period. A horizontal double-headed arrow labeled "20'" indicates the duration of this period.

Notes :

- (1) Pressing the "POWERFUL" button will reduce the temperature setting by PWSFTSD.
- (2) The powerful operation is for 20 minutes after setting.
- (3) Operation is continued forcibly thermo-ON for 20 minutes after the powerful operation is finished.
- (4) Pressing the "START/STOP" button and "POWERFUL" button during powerful operation will cancel the powerful operation.
- (5) If the sleep timer is set during powerful operation, the powerful operation will be canceled.
- (6) If the differential (the room temperature - the temperature setting) is "the differential $\geq 3^{\circ}\text{C}$ " after powerful setting, the compressor's maximum speed during powerful operation will be set to SDMAX. Then the differential reduce "the differential $\leq 2.33^{\circ}\text{C}$ " during powerful operation, the compressor's speed will be set to SDRPM.
If the differential (the room temperature - the temperature setting) is "the differential $< 3^{\circ}\text{C}$ " after powerful setting, the compressor's minimum speed during powerful operation will be set to SDRPM.
- (7) The fan speed increases by FNUPPW_D.

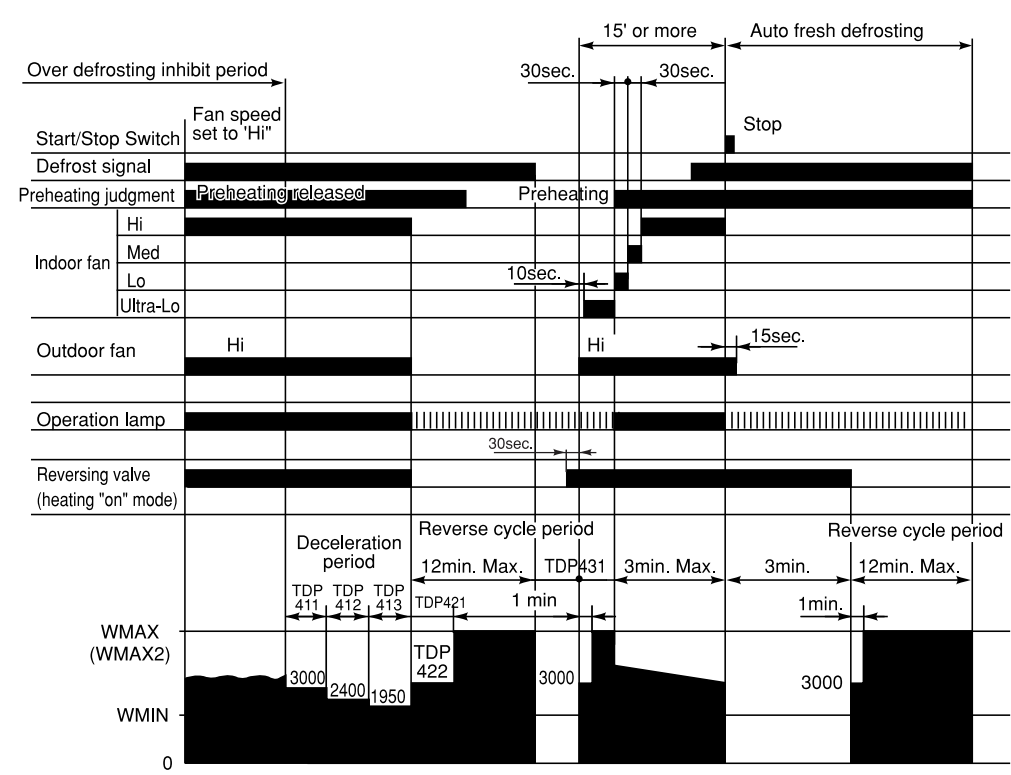
Basic Heating Operation



Notes:

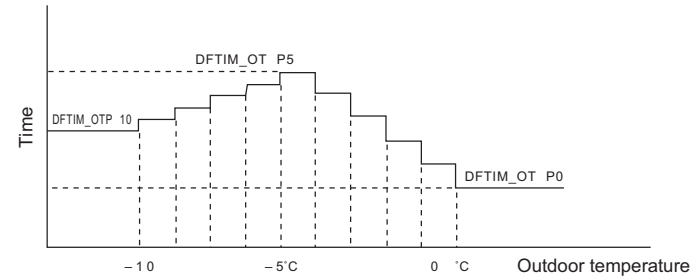
- (1) Condition for entering into Hot Dashed mode. When fan set to "Hi" or "Auto mode" and i) Indoor temperature is lower than 18°C , and ii) outdoor temperature is lower than 10°C , and iii) compressor speed (P section) due to temperature difference between setting temperature (including the correction shift only) and room temperature is WMAX or higher.
- (2) Hot Dashed will release when i) Room temperature has achieved the set temperature + SFTDSW. ii) Thermo off.
- (3) During Hot Dashed operation, thermo off temperature is set temperature (with shift value) $+3^\circ\text{C}$. After thermo off, operation continue in Fuzzy control mode.
- (4) Compressor minimum "ON" time and "OFF" time is 3 minutes.
- (5) During normal heating mode, compressor maximum rpm WMAX will maintain for 120 minutes if indoor temperature is higher than 18°C . No time limit constrain if indoor temperature is lower than 18°C and outdoor temperature is lower than 2°C .
- (6) During Hotkeep or Defrost mode, indoor operation lamp will blink at interval of 3 seconds "ON" and 0.5 second "OFF".
- (7) When heating mode starts, it will enter into Hotkeep mode if indoor heat exchanger temperature is lower than $\text{YNEOF} + 0.33^\circ\text{C}$.
- (8) When fan is set to "Med" or "Lo", compressor rpm will be limited to WBEMAX.
- (9) In "Silent" fan mode, if indoor temperature is lower than 18°C , indoor fan will stop. If indoor temperature is higher than $18^\circ\text{C} + 0.33^\circ\text{C}$, fan will continue in "Ultra-Lo" mode. During Hotkeep or Defrost mode, fan will continue in "silent" mode.
- (10) During Hot Dashed or outdoor temperature is lower than -5°C , compressor rpm is WMAX2.
- (11) During Hot Dashed, when room temperature reaches set temperature + SFTDSW compressor rpm is actual rpm x DWNRATEW.

Reversing Valve Defrosting



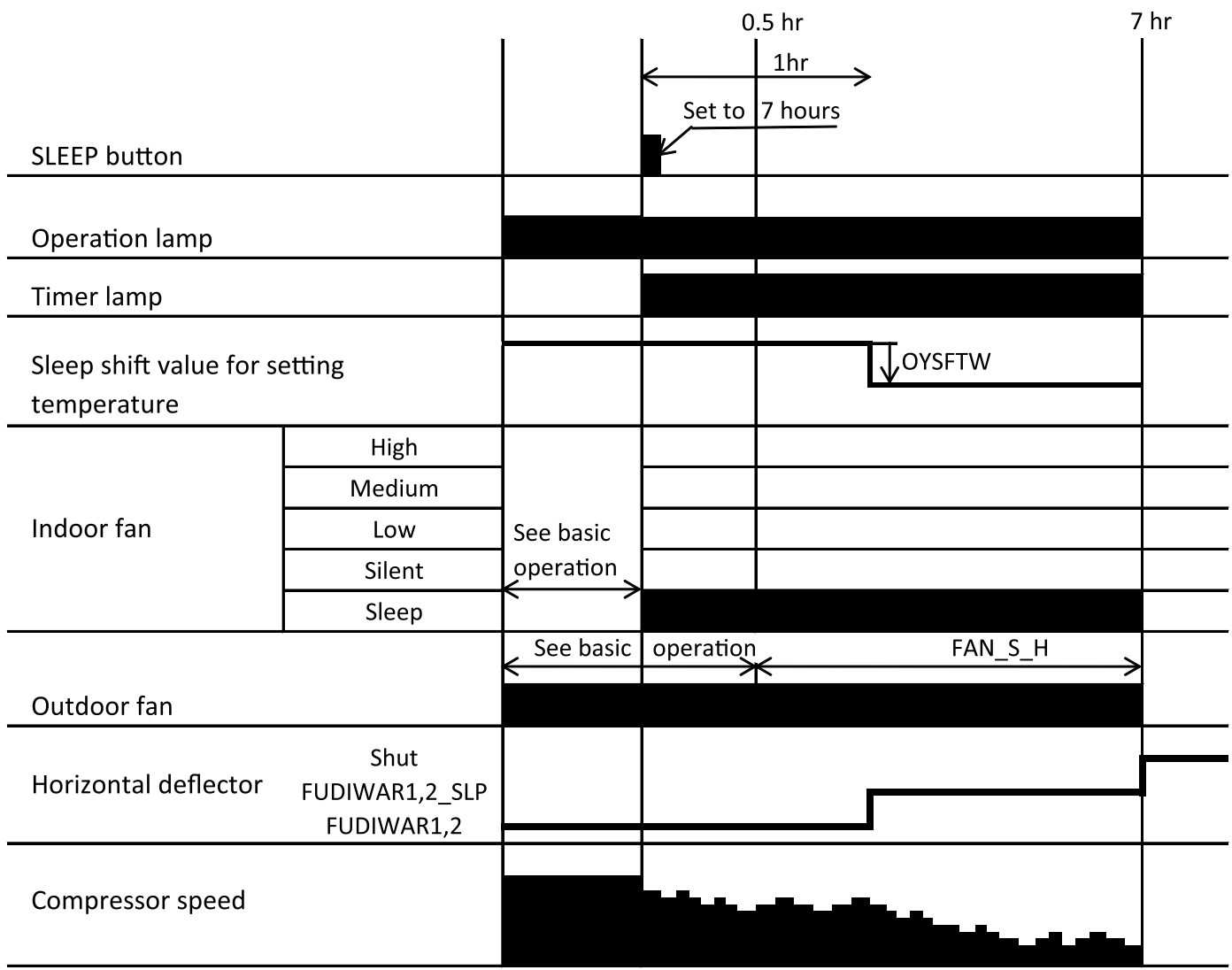
- Notes:
- (1) The defrosting inhibit period is set as shown in the diagram below. When defrosting has finished once, the inhibit period is newly set, based on the outdoor temperature when the compressor was started. During this period, the defrost signal is not accepted.
 - (2) If the difference between the room and outdoor temperature is large when defrosting is finished, the maximum compressor speed (WMAX) or (WMAX2) can be continued for 120 minutes maximum.
 - (3) The defrosting period is 12 minutes maximum.
 - (4) When operation is stopped during defrosting, it is switched to auto refresh defrosting.
 - (5) Auto refresh defrosting cannot be engaged within 15 minutes after operation is started or defrosting is finished.

Setting Defrosting Inhibit Period

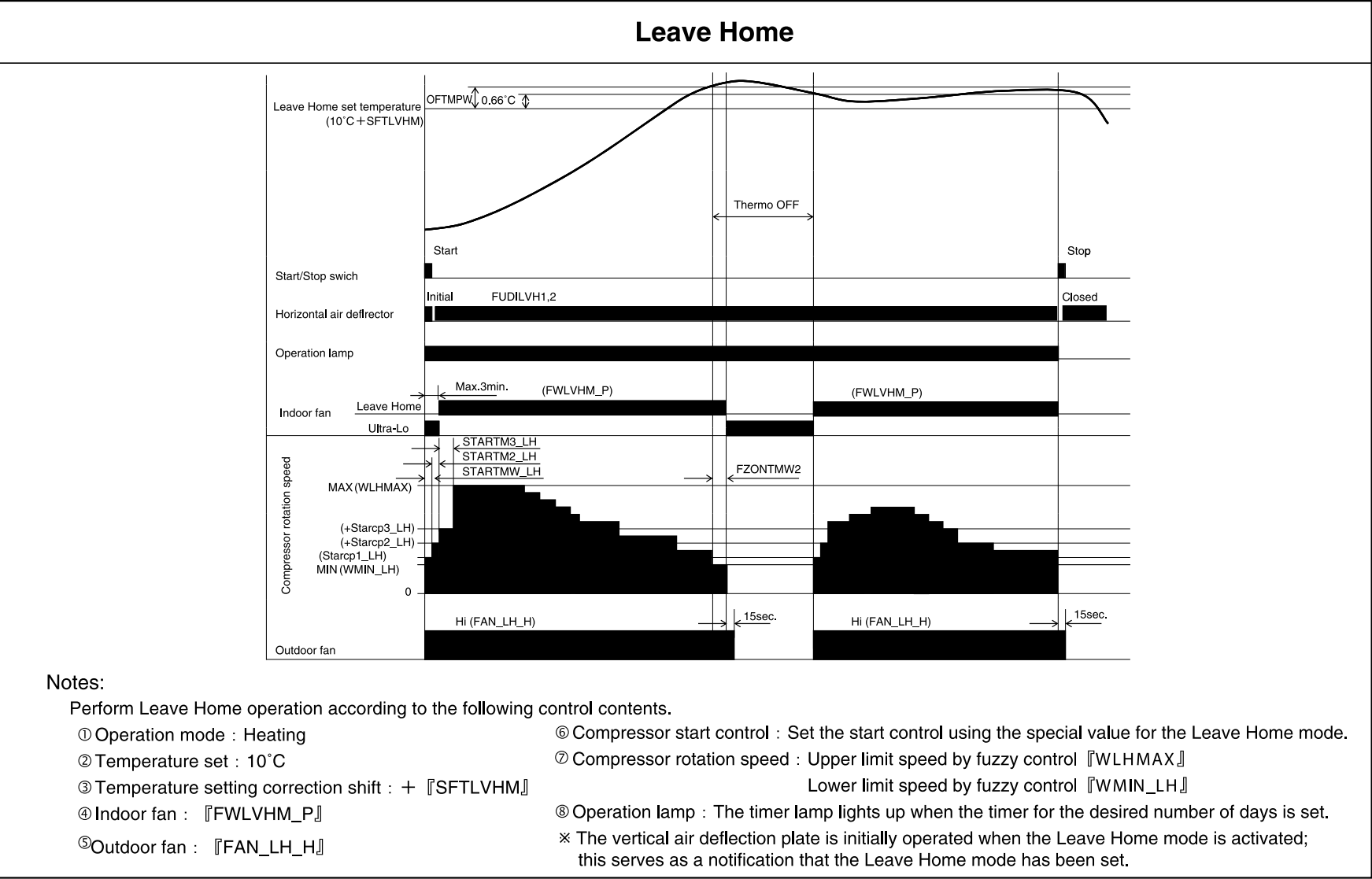
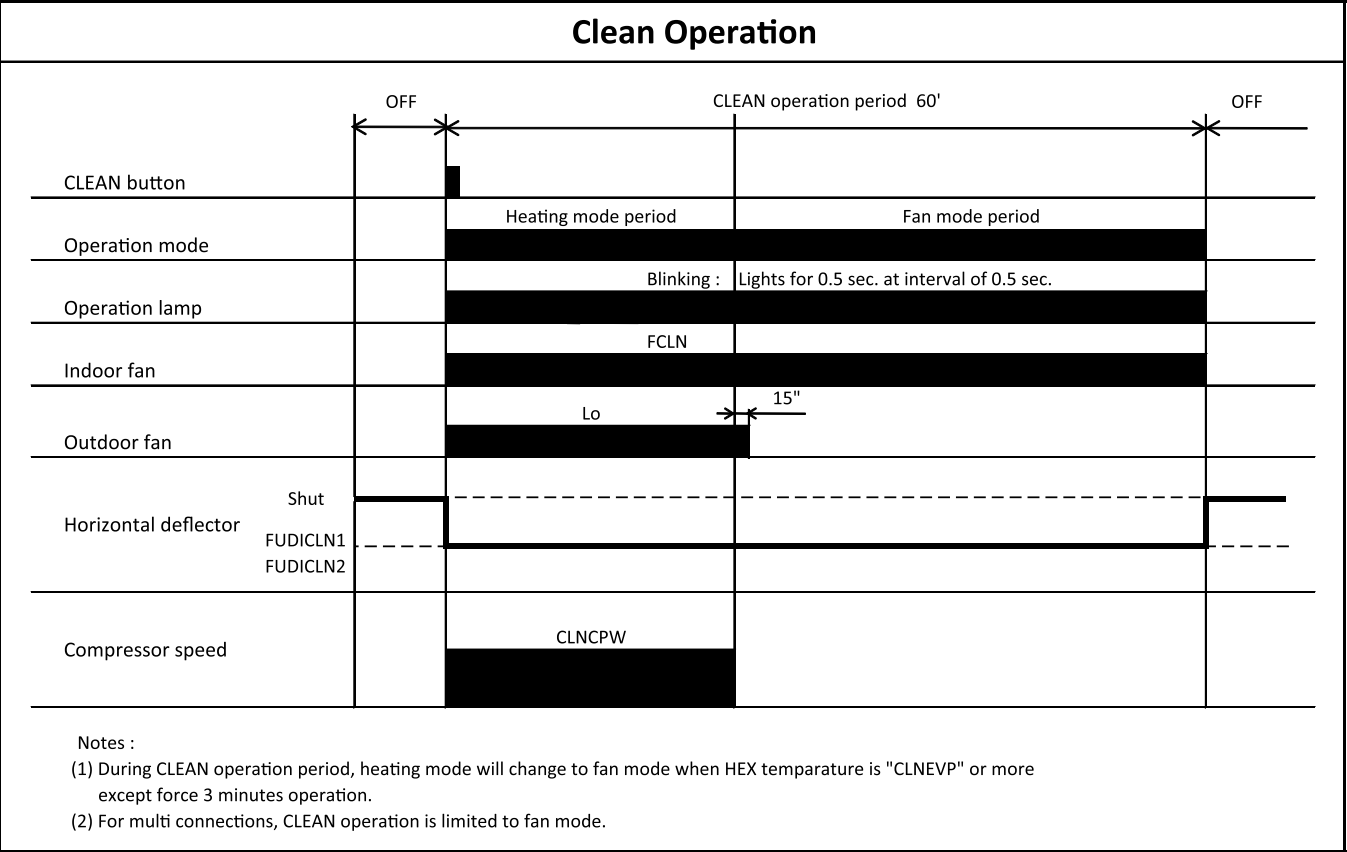
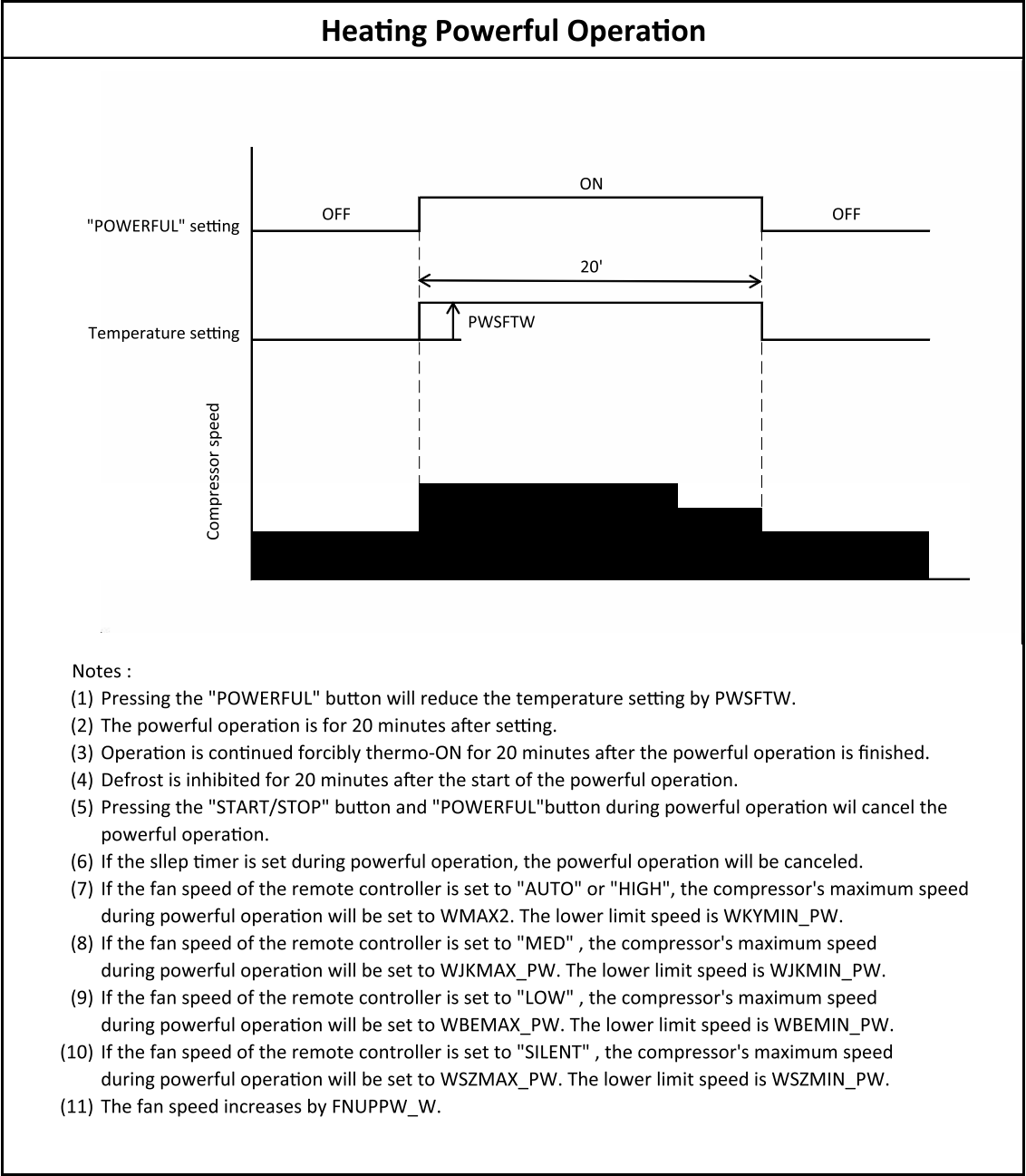


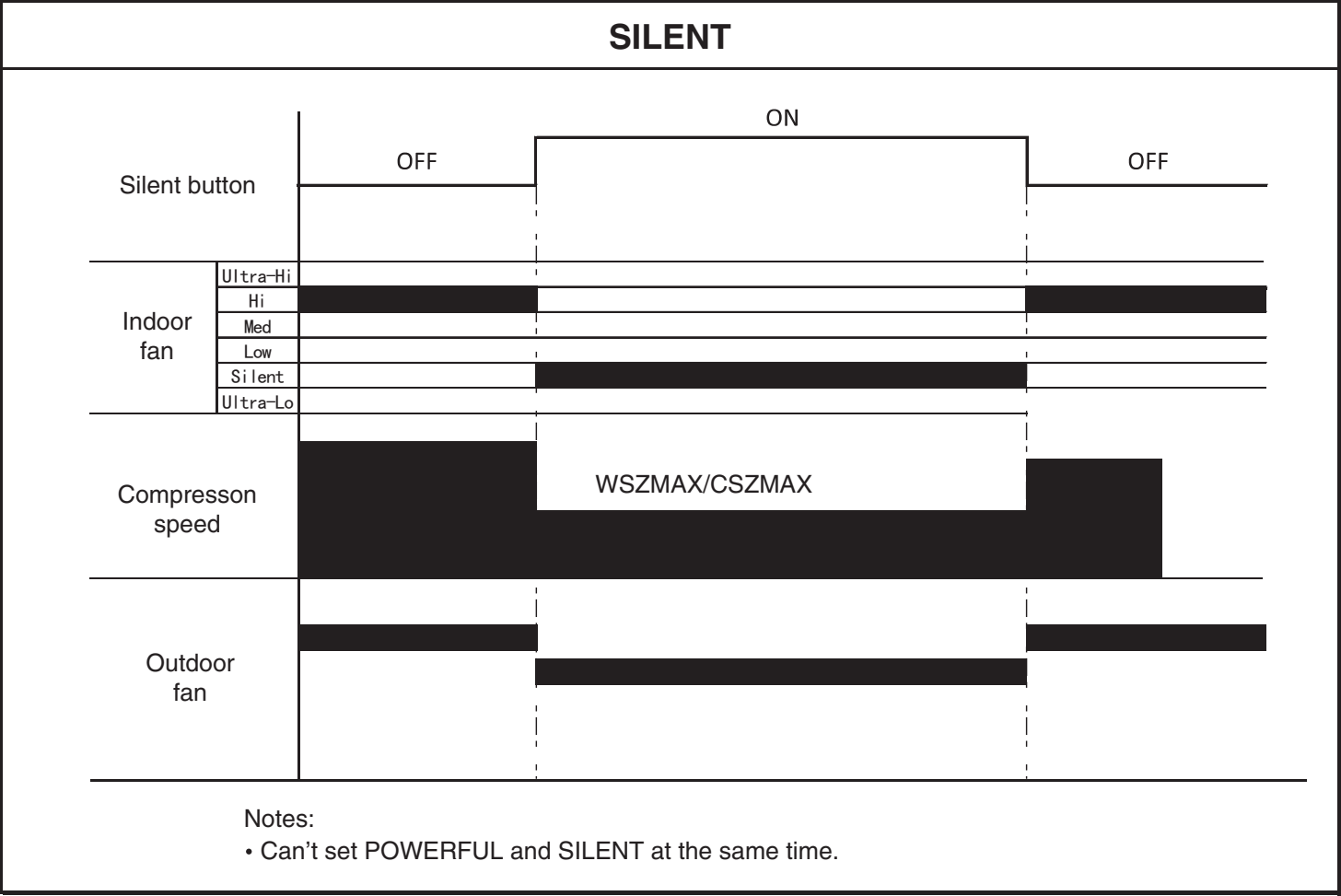
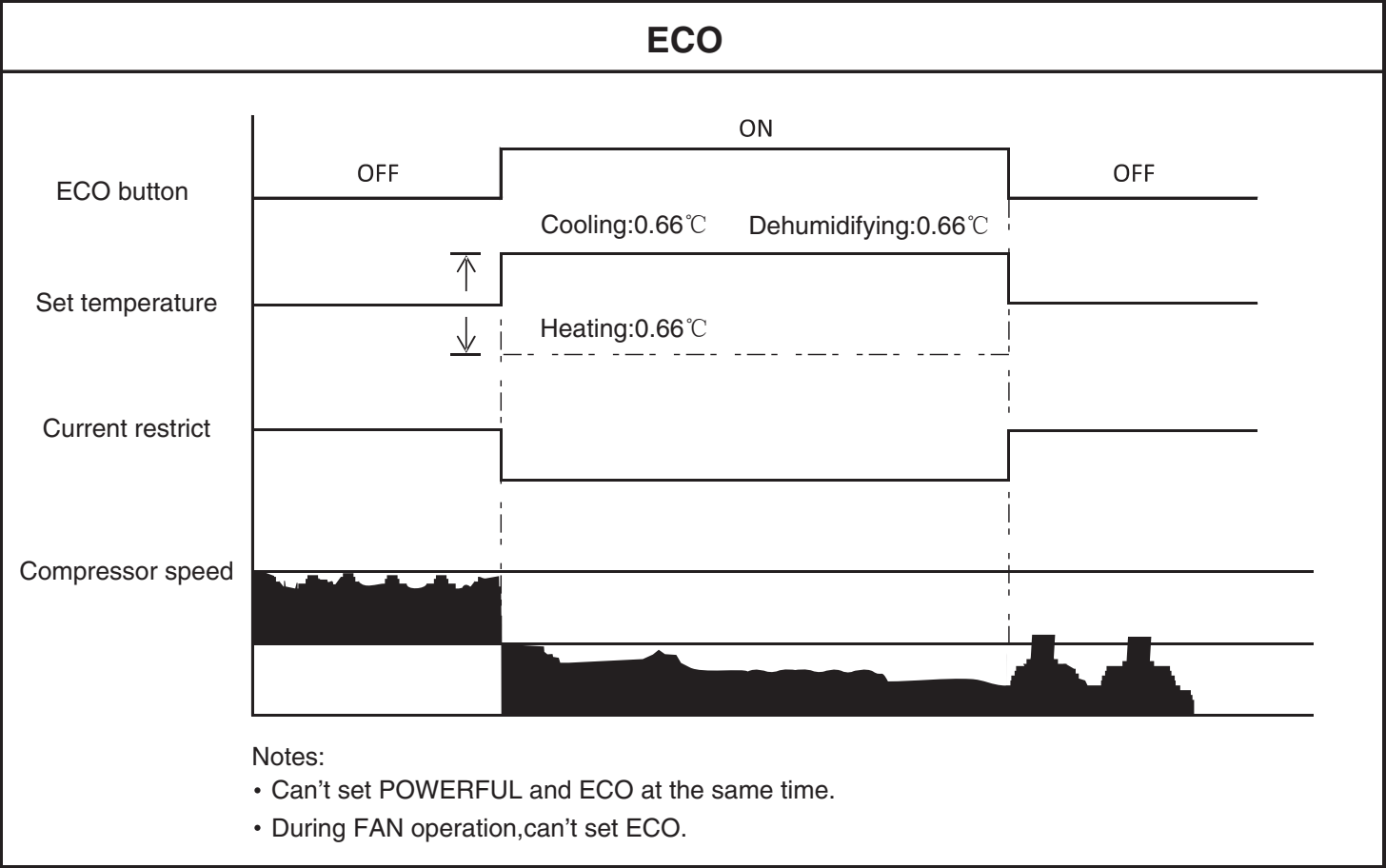
- Notes:
- (1) The first inhibit time after operation start is set to DFTIM_FST.
 - (2) From the second time onwards, the inhibit time is set according to the time required for defrosting.
Reverse cycle operation time $\geq$ [DEFCOL] : DEFTIM_COL is set.
Reverse cycle operation time $<$ [DEFCOL] : The time corresponding to outdoor temperature is set.

Heating Sleep Operation



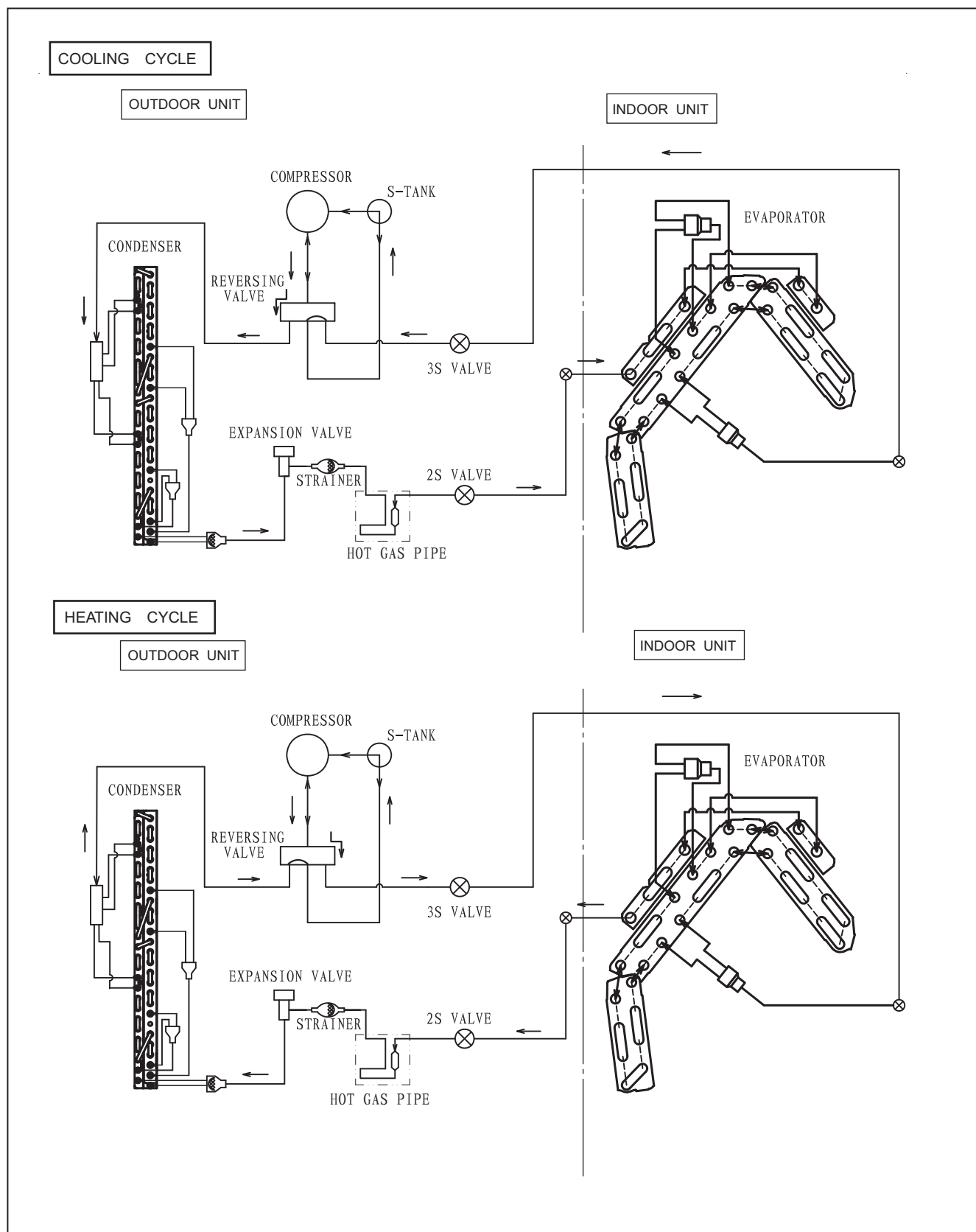
- Notes :
- (1) The sleep operation starts when the "SLEEP" button is pressed.
 - (2) When the sleep operation is set, the maximm compressor speed is limited to WSZMAX, and the indoor fan set is "sleep"(FWSOY_P).
 - (3) The indoor fan speed does not change even when the fan speed mode is changed.
 - (4) If sleep operation is canceled by the cancel button or sleep button, all data is cleared.
 - (5) 1 hour after the sleep operation is set, the sleep shift value(OYSFTW) is reduced.





REFRIGERATING CYCLE DIAGRAM

MODEL RAK-18/25/35PSPA
 RAC-18/25/35WSPA



Procedure for Disassembly and Reassembly

INDOOR UNIT RAK-18/25/35PSPA

1. Front Panel

- (1) Pull up the washable panel by holding it at both lower sides with both hands.

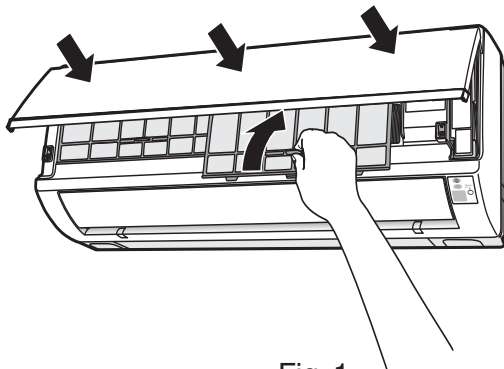


Fig. 1

- (2) When the panel opens full, push the inner part of the right arm into the inside and pull the panel forward while closing it gradually.

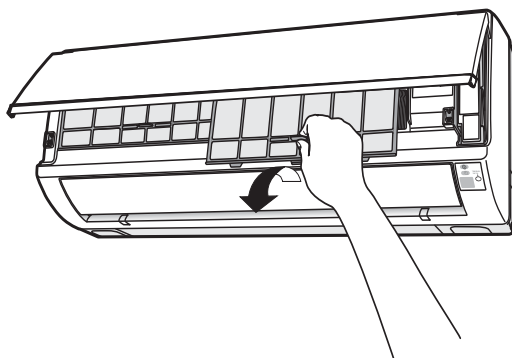


Fig. 2

2. Front cover

- (1) After removing two screws, pull the center of the front cover forward and release the claws.
- (2) Hold the front cover at both lower sides and pull them forward to remove.

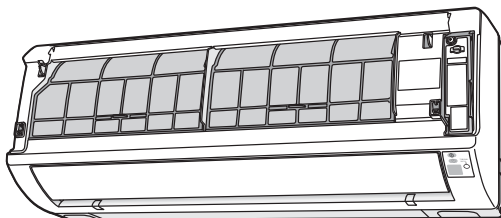


Fig. 3

3. Control P.W.B. and Indicating P.W.B.

- (1) Remove each connector from the lead wire.
- (2) Remove the four P.W.B. supports from the control P.W.B.
- (3) Pull the support hook at the upper side of the indication lamp of the indicating P.W.B. and pull out the P.W.B. forward.

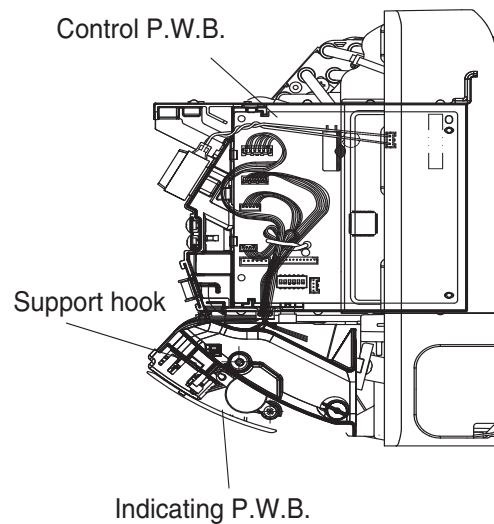


Fig. 4

4. Tangential air flow fan and fan motor

- (1) Remove two screws locking the drain pan.
- (2) Press to lower the hook at the center of the unit a little and pull the claw forward to remove the drain pan.

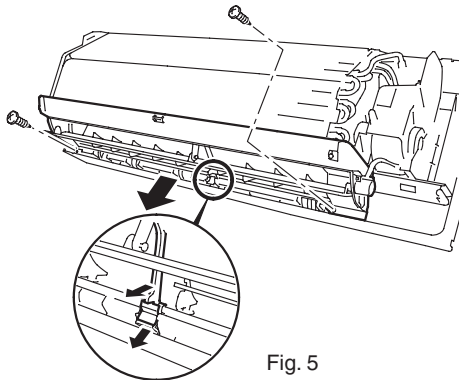


Fig. 5

- (3) Remove the lower bearing covers.
- (4) Remove the locking hook of the lower bearing cover from the Cabinet.

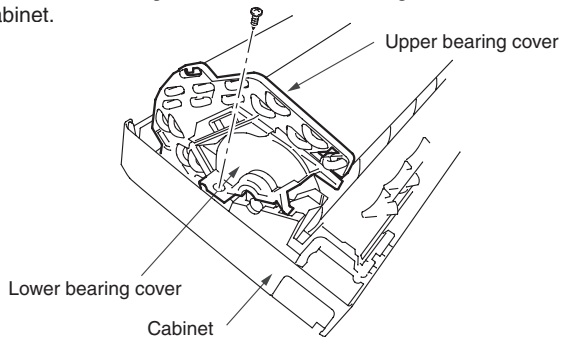


Fig. 6

- (5) Remove the screws that fix the bearing cover to the left of the evaporator.
- (6) Lift the left side of the evaporator, pull it towards you, and detach the lug of the bottom of the bearing cover.
- (7) Remove the screws that fix the fan motor retainer.
- (8) Push the bottom of the evaporator upwards and remove the lugs of the fan motor retainer.
- (9) Loosen the fan-fixing screws and remove the fan.

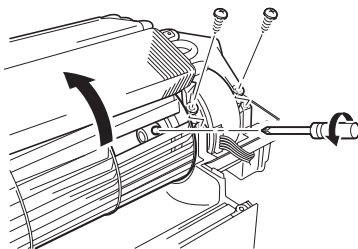


Fig. 7

- (10) Remove the rubber dampers from the left and right sides of the fan motor.
- (11) Turn the fan motor towards you, thereby removing it.

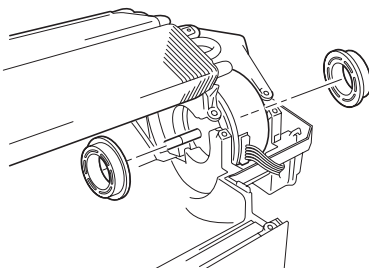


Fig. 8

OUTDOOR UNIT MODEL RAC-18/25/35WSPA

1. Electrical parts

- (1) Remove the service value cover lock screws and lower the cover to remove it.
- (2) Remove the top cover lock screw and raise the cover to remove it.

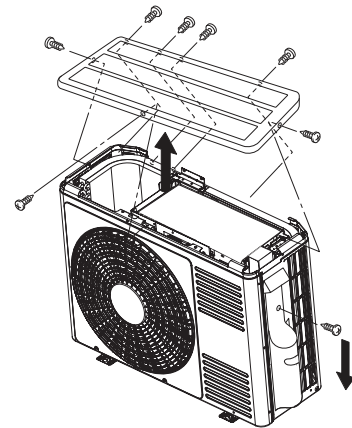


Fig. 9

- (3) Remove the front cover lock screw.
- (4) Lower the right side of the front cover and pull it forward. Then, remove the cover from the hook.
- (5) Pull the right side of the front cover a little and pull up the left side to remove it from the hook.

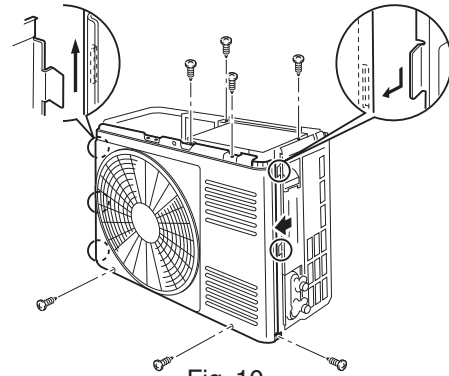


Fig. 10

- (6) Remove each connector and earth cable from the lead wire. Then, remove the electrical box.

DESCRIPTION OF MAIN CIRCUIT OPERATION

MODEL RAK-18/25/35PSPA

1. Power circuit

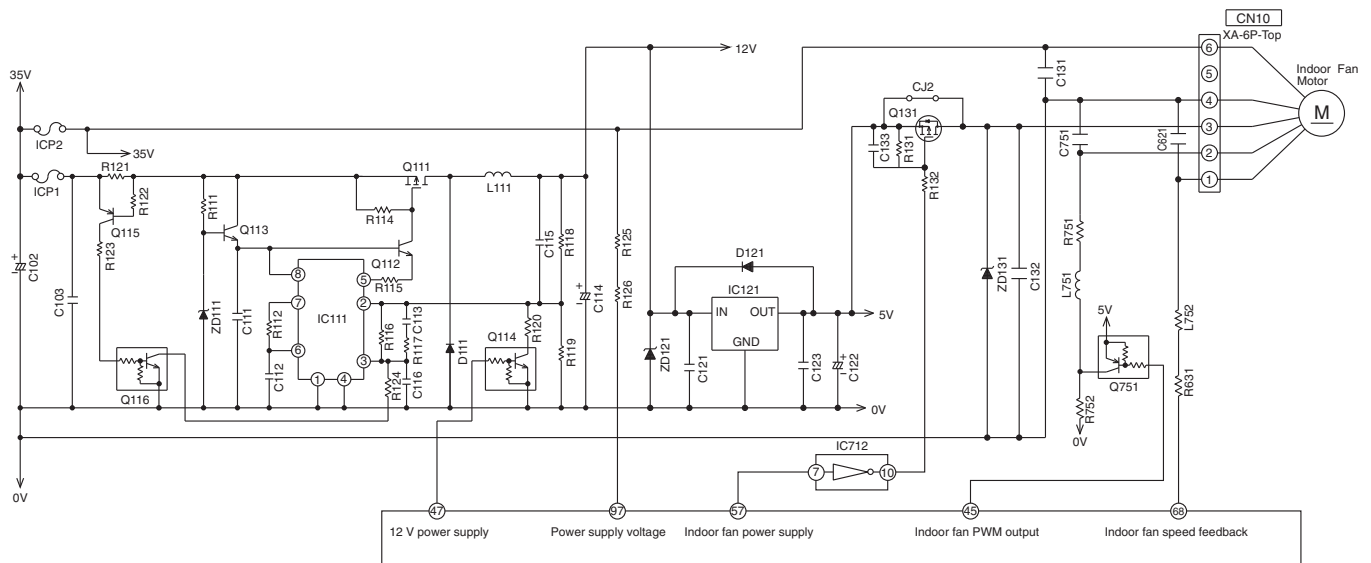


Fig. 1-1

Power to operate indoor unit (DC35V) is generated at the power supply in outdoor unit and it is sent to indoor unit through the connecting cord C and D.

Then, DC 12V (12V line) is generated using DC/DC converter from the voltage sent from outdoor unit, as the control voltage of 12V is required to drive the auto sweep motor and others.

Furthermore, 5V (5V line), which is necessary to drive the microcomputer and to control the fan motor, is generated using three-terminal regulator IC121.

2. Reset Circuit

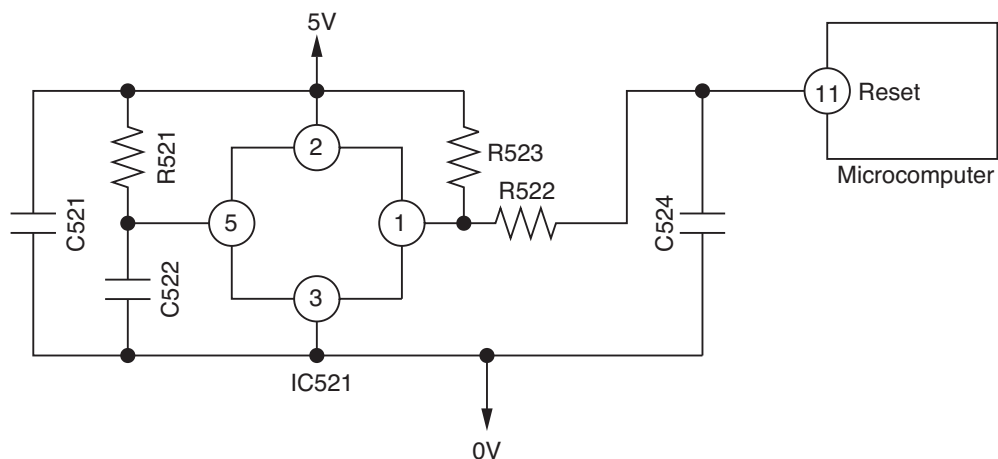


Fig.2-1

Timing chart

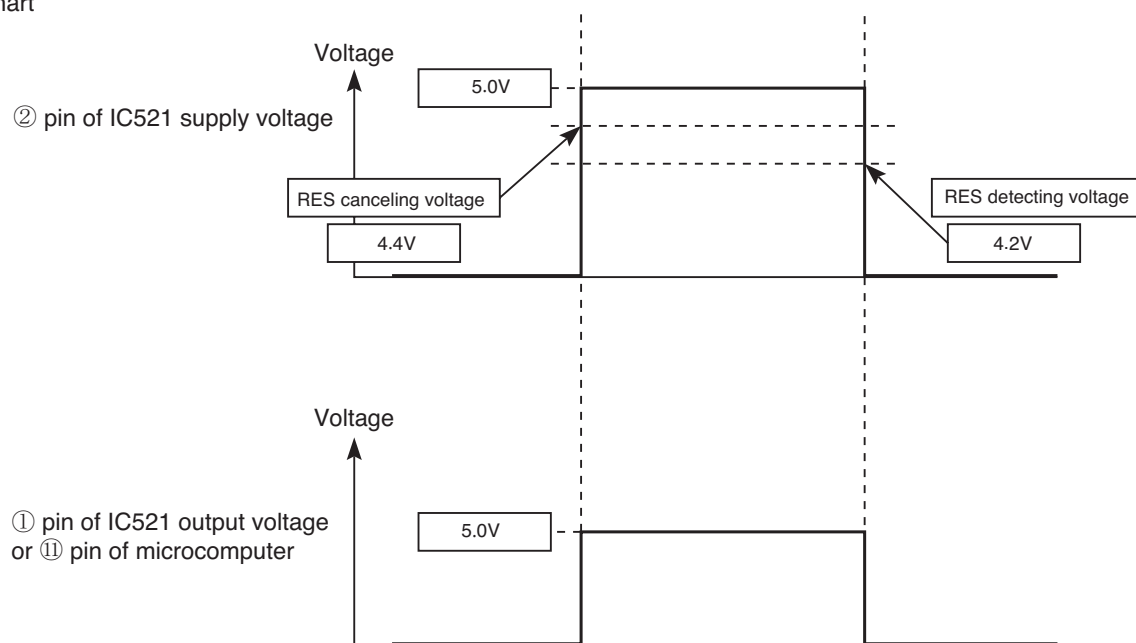


Fig.2-2

- Reset circuit is to initialize the indoor unit microcomputer when switching ON the power or after recovering from power failure.
- Microcomputer operates when ⑪ pin of the indoor unit microcomputer (reset input) is "Lo" for resetting and "Hi" for heating.
- Waveform of each part when switching ON the power and when shutting down is shown in the Fig. 2-2.
- After switching ON the power, ① pin of IC521 supply voltage and ⑪ pin of microcomputer becomes Hi when DC5V line rises and reaches approximately 4.4V or higher.
Then, resetting will be cancelled and microcomputer starts operating.
- After shutting down the power, ① pin of IC521 supply voltage and ⑪ pin of microcomputer becomes Lo when DC5V line falls and reaches approximately 4.2V or lower.
Then, the microcomputer will be in reset condition.

3. Fan Motor Drive Circuit

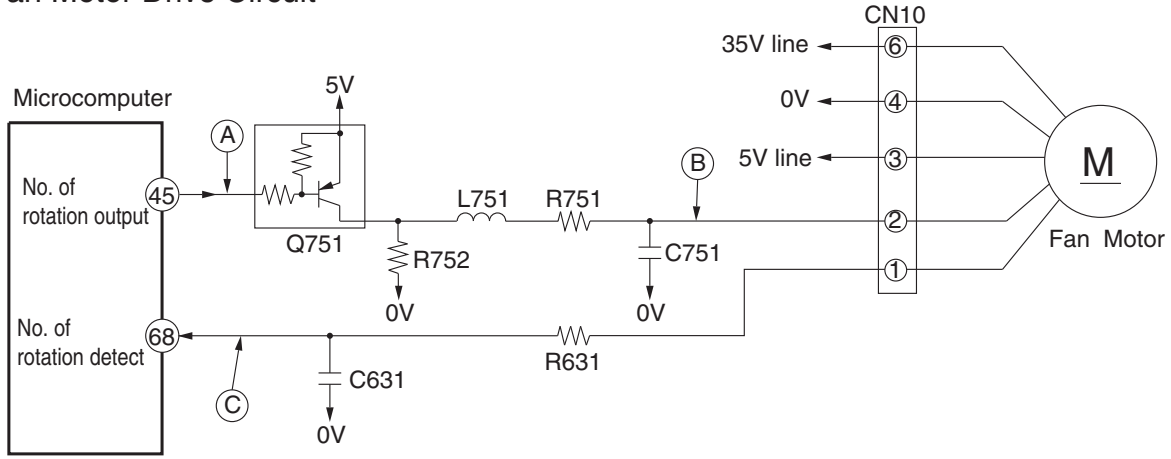


Fig. 3-1

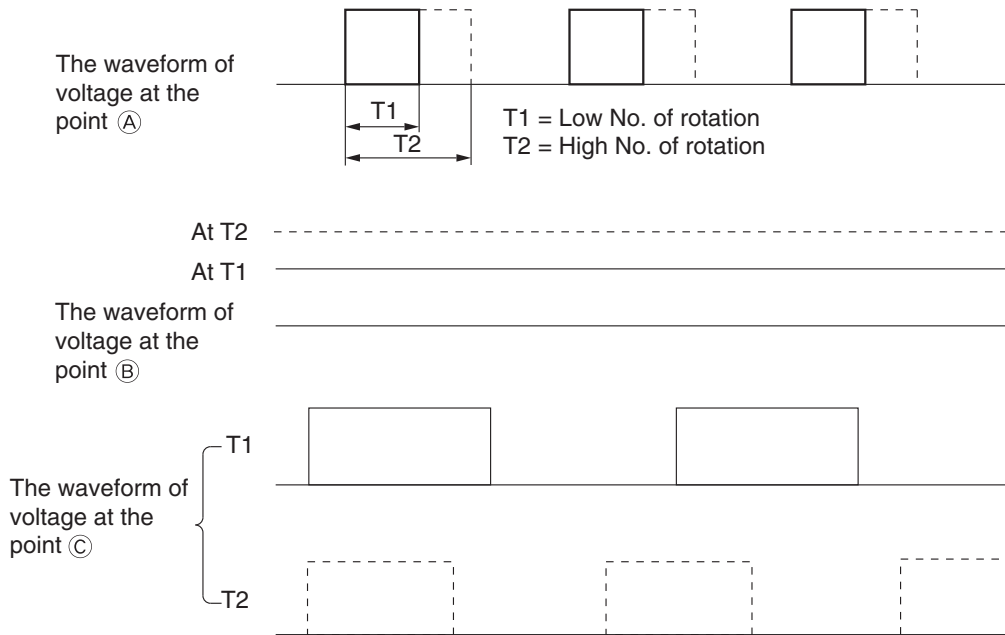


Fig. 3-2

- The 610Hz PWM pulse shown in Fig. 3-2 from the microcomputer pin ④⑤ is output to point ①. The width of this pulse changes with instruction number of rotations.
- This pulse changes to analog voltage by R751 and C751 and it is applied to the fan motor as instruction voltage number of rotations. The relationship between the voltage of point ② and number of rotations becomes as shown in Fig. 3-3. (The gap may arise depending on the condition of unit.)
- The feedback pulse of number of rotation is outputted from the fan motor and input to micro computer pin ⑥⑧. The frequency of this pulse is 12/60 of the number of rotations. (Ex: $1000\text{min}^{-1} \times 12/60 = 200\text{Hz}$) The microcomputer observes this frequency and to make it as the instruction number of rotation all the time, adjusts the output pulse width of pin ④⑤.
- If the feedback pulse becomes lower than 100min^{-1} caused by lock or failure of a fan motor, the fan output stops temporary as the fan lock is faulty. The pulse will output again after 10 seconds. If the abnormal in fan lock is detected twice in 10 minutes, the unit is completely stopped and change to the fault mode which the timer lamp blinks 10 times.

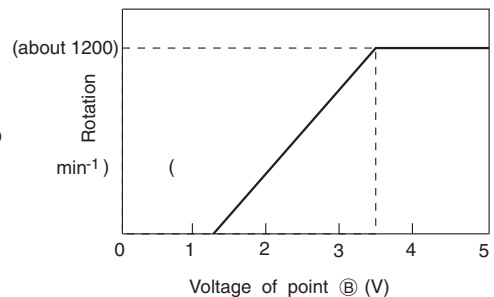


Fig. 3-3

4. Buzzer Circuit

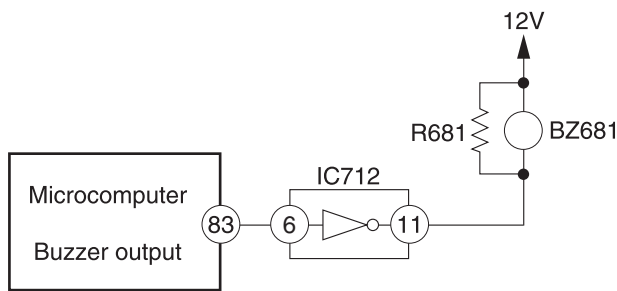


Fig.4-1 Buzzer Circuit

- When the buzzer sounds, an approx. 3.9kHz square signal is output from buzzer output pin (83) of the micro computer. After the amplitude of this signal has been set to 12Vp-p by a transistor, it is applied to the buzzer. The piezoelectric element in the buzzer oscillates to generate the buzzer's sound.

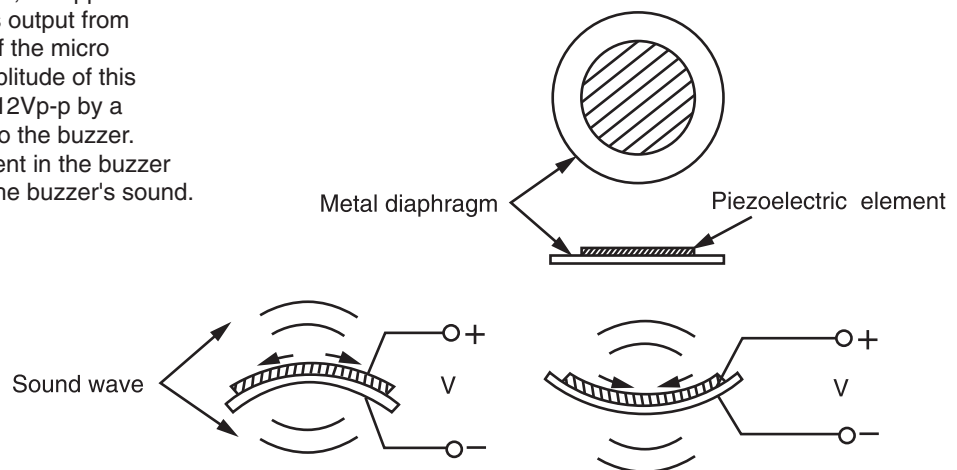


Fig.4-2 Buzzer Operation

5. Receive Circuit

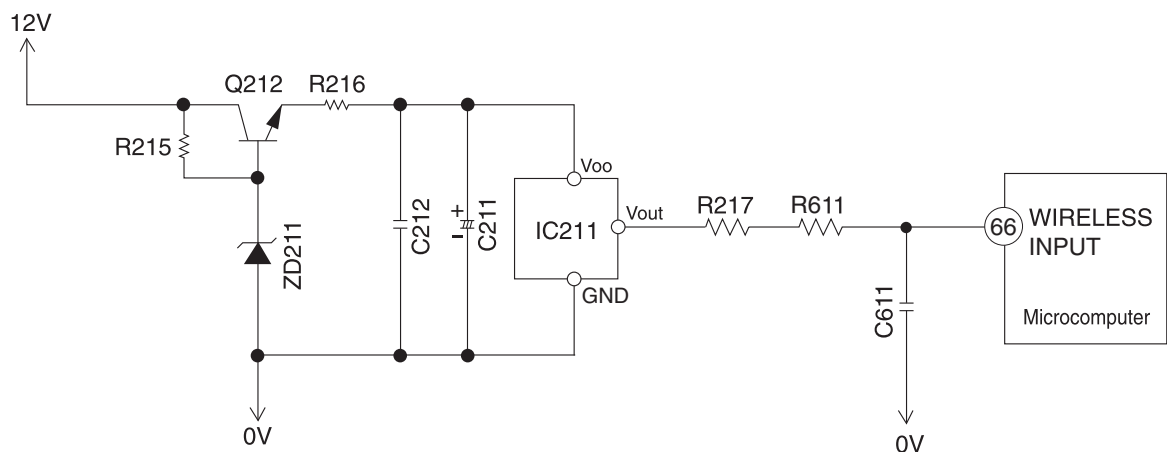


Fig.5-1

- The light receiving unit receives an infrared signal from the wireless remote control. The receiver amplifies and shapes the signal and outputs it.

6. Initial Setting Circuit (IC401)

- When power is supplied, the microcomputer reads the data in IC401 (E²PROM) and sets the preheating activation value and the rating and maximum speed of the compressor, etc. to their initial values.
- Data of self-diagnosis mode is stored in IC401; data will not be erased even when power is turned off.

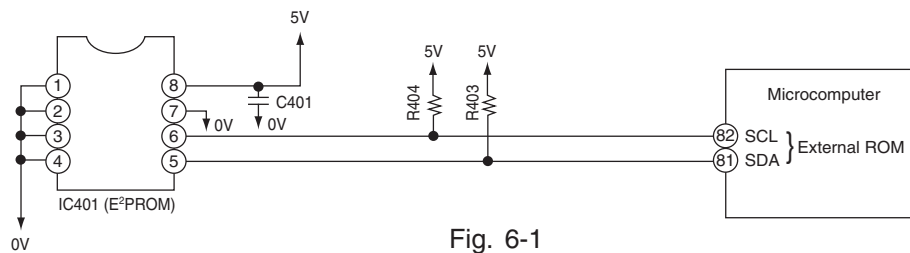


Fig. 6-1

7. Temporary Switch Circuit

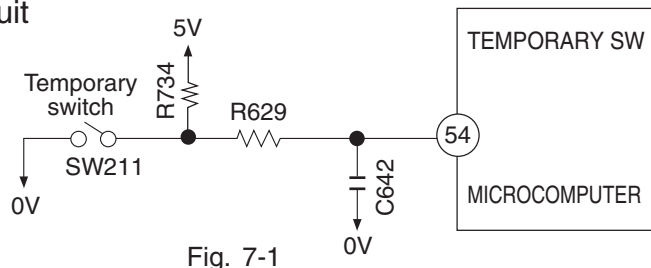


Fig. 7-1

- The temporary switch is used to operate the air conditioner temporarily when the wireless remote control is lost or faulty.
- The air conditioner operates in the previous mode at the previously set temperature. However, when the power switch is set to OFF, it starts automatic operation.

8. Room Temperature Thermistor Circuit

A room temperature thermistor circuit is shown in Fig. 8-1.

According to room temperature, the voltage of point ① becomes as it is shown in Fig.8-2.

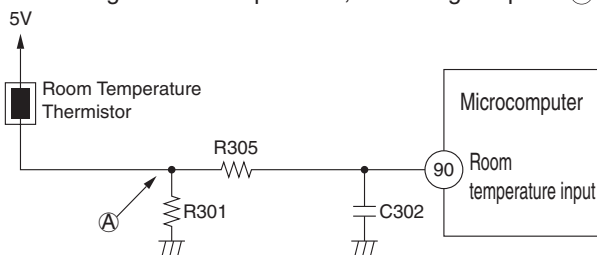


Fig. 8-1

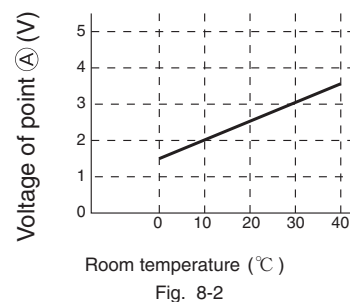


Fig. 8-2

9. Heat Exchanger Thermistor Circuit

Heat exchanger temperature is noticed inside the room

- (1) Preheating
- (2) Low-temperature defrosts at cooling and dehumidification operation time.
- (3) Not working of reversing valve or detection of opening of heat exchange thermistor is controlled.

According to heat exchange temperature, the voltage of point ① becomes as it is shown in Fig. 9-2.

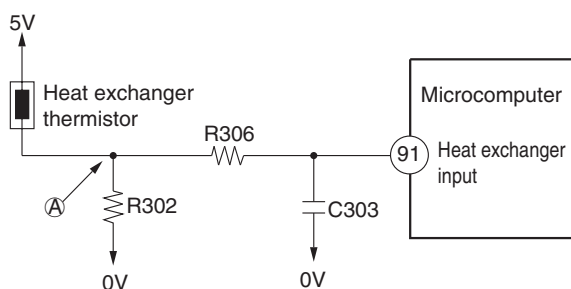


Fig. 9-1

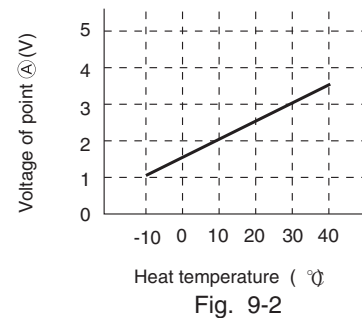


Fig. 9-2

10 . Dip-switch

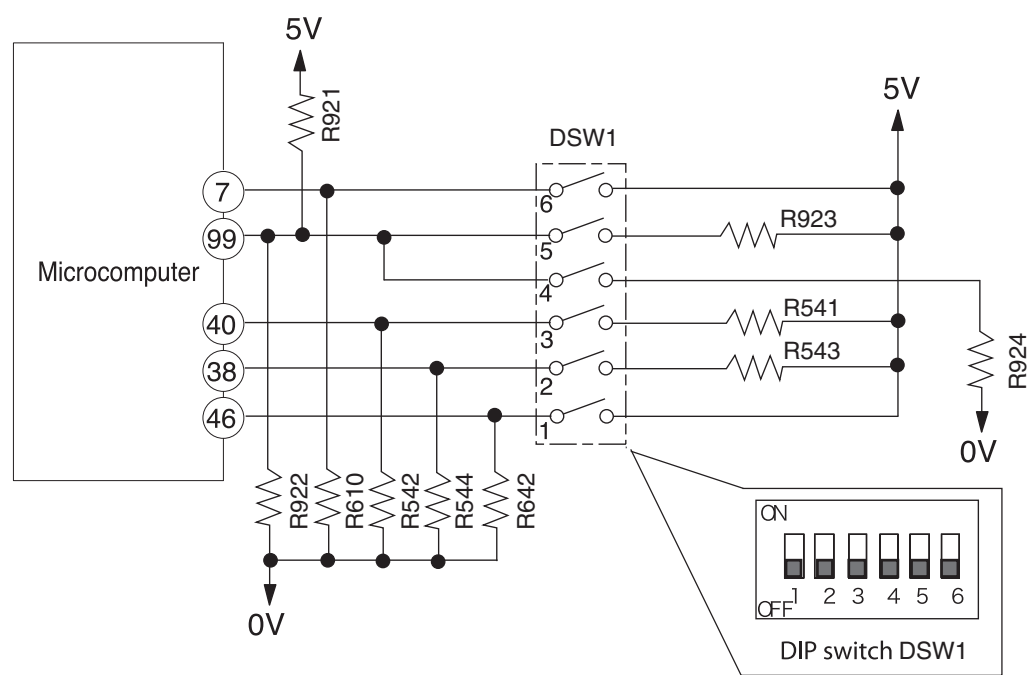


Fig.10-1Dip switch Circuit

- Fig.8-1 shows the dip switch circuit; the table shown in Fig.10-2 are function and setting position from ① –⑥ of the switch no.

Switch No.	FUNCTION	Switch Position/Setting.				
1	AUTO RESTART	OFF*	ENABLE	ON	DISABLE	-----
2	CARD KEY MODE	OFF*	DISABLE	ON	ENABLE	-----
3	CARD KEY LOGIC SELECT	OFF*	INPUT HIGH ACTIVE	ON	INPUT LOW ACTIVE	-----
4	HEATING/COOLING ONLY MODE SELECT	OFF*	NORMAL (HEAT AND COOL)	OFF		ON
5	HEATING/COOLING ONLY MODE SELECT	OFF*		ON		OFF
6	REMOCON ID SELECT ※ 1	OFF*	SELECT ID A	ON	SELECT ID B	-----

Fig.10-2 Functions of Dip switch

NOTE:

- * Marking is position of shipping [FACTORY default setting]
- ※ 1 Weekly Timer wireless remocon for new model have function of setting remocon ID A or B. This remocon using model can not operate “DIP SWITCH 6” (disabled by EEPROM data flag.)
- If the dip switch is set to “Heating mode only” or “Cooling mode only”, the wireless remote controller must be set to operation mode lock setting as indicated on page 93 .

MODEL RAC-18/25/35WSPA

1. Power Circuit

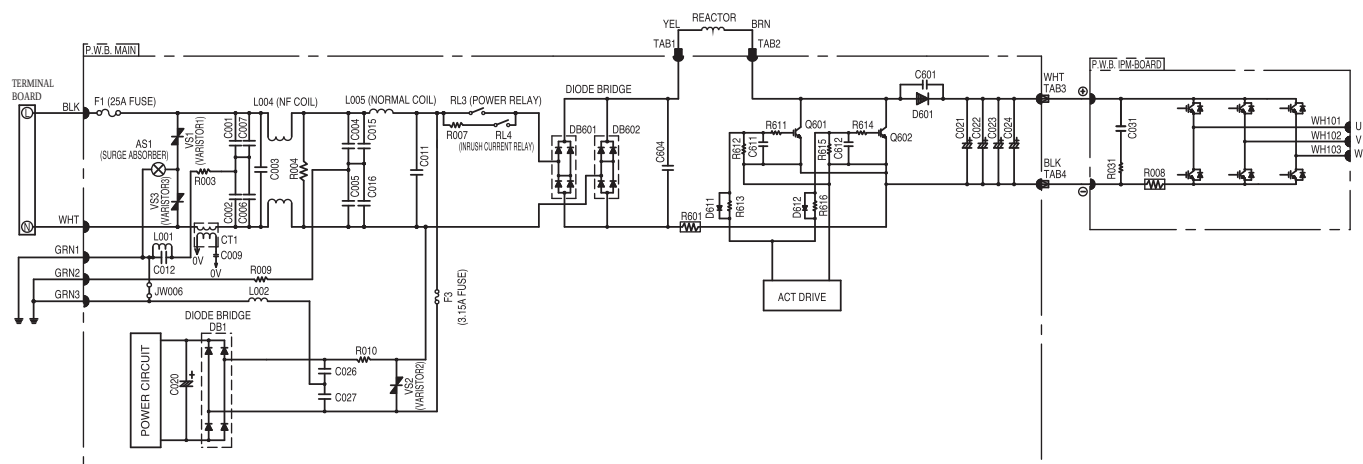


Fig 1-1

※ This circuit full-wave rectifies 220-230VAC applied between terminals L and N and boosts it to a required voltage with the IPM to create a DC voltage.

The voltage become 320-360V when the compressor is operated.

※ Importance component

(1) Intelligence Power Module (IPM)

A module that constitute by an inverter part.

(2) Diode Stack (DB1, DB601, DB602)

These rectify the 220-230VAC from terminal L and N to a DC power supply.

<Reference>

※ In case of Intelligence Power Module malfunction or connection failure immediately after compressor starts, its may stop due to error of [abnormal low speed], [switching failure],[Ip stop] and others.

<Reference>

※ If diode stack (DB601,DB602) are faulty, DC voltage may not be generated and the compressor may not operate at all. Also be aware that the 25A fuse might have blown.

※ If DB1 is faulty compressor may not operate at all. Also be aware that the 3.15A fuse might have blown.

(3) Smoothing capacitors (C021-C024, 400 μ F, 450V)

This smoothes (averages) the voltage rectified by the diode stack.

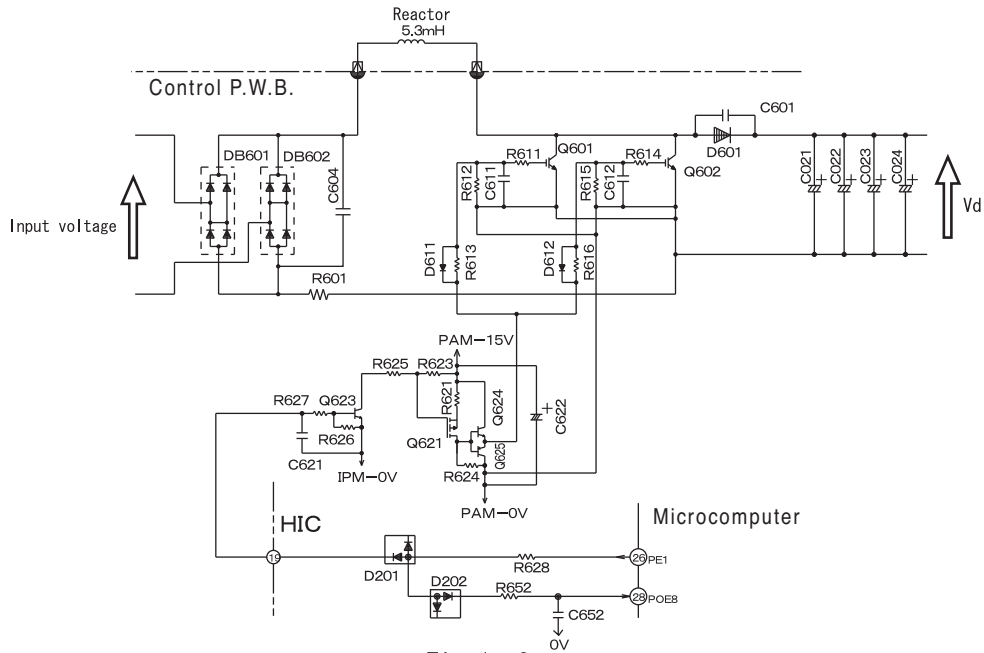


Fig. 1-2

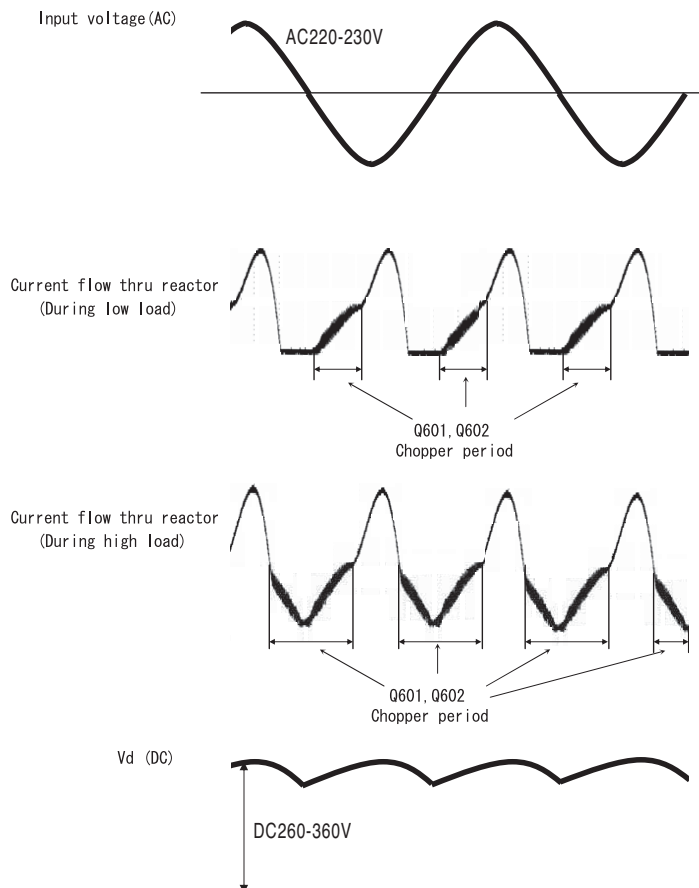


Fig. 1-3

(4) IGBT to improve efficiency (Q601, Q602)

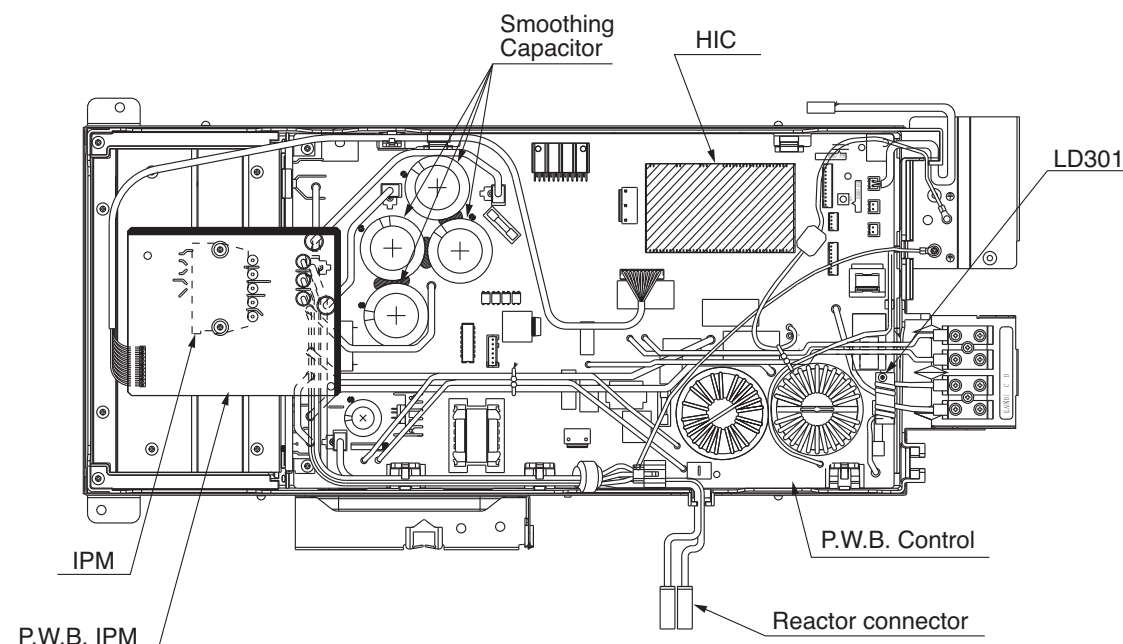
It will improve the efficiency during compressor load become heavy when current flow thru the chopper period of Q601, Q602.

(5) C001-C007, C015, C016, C026, C027, L004, L005

These absorb electrical noise generated during operation of compressor and also absorb external noise entering from power line to protect electronic parts.

(6) Surge Absorber, Varistor1,2,3

These absorb external power surge.



※Be careful to avoid an electric shock as a high voltage is generated. Also take care not to cause a short-circuit through incorrect connection of test equipment terminals. The circuit board can be damage.

2. P.W.B. for power circuit

Voltage specification of power circuit as shown in below table.

〈Checking point〉

Output	Spec	Main load	Measuring point	Example of possible failure mode.
5V O/P	$5 \pm 0.4V$	Micon, Thermistor	Tester⊕ : L105 (5V) Tester⊖ : J25 (0V)	Outdoor not operate, no blinking indication
12V O/P	$12 \pm 1V$	Micon, IC2, 3, 4 Relay circuit	Tester⊕ : L104 (12V) Tester⊖ : J25 (0V)	Outdoor not operate, no blinking indication
16V O/P	$15.5 \pm 1.5V$	IPM for Comp IPM for DC fan	Tester⊕ : J58 (16V) Tester⊖ : J25 (0V)	Stop : LD301 3,4 or 12 times blinking
PAM-15V O/P	$15 \pm 1.59V$	ACT circuit	Tester⊕ : J23 (PAM-15V) Tester⊖ : J25 (0V)	Stop : LD301 14 times blinking

※ Power circuit for pwb can consider normal if the result is satisfied with above specification.

3. Latch-type reversing valve control circuit

- This model comes equipped with a latch-type reversing valve.
- The latch-type reversing valve is so designed that its valve is "slid" in a specified direction according to a specific operation mode, thereby switching freezing channels and retaining the built-in permanent magnet.
- The latch-type reversing valve control circuit is so designed that, in response to an operation command from the indoor microcomputer, the reversing valve coil receives a current in a specified direction according to a specific operation mode, thereby sliding the valve.
- The product is energized twice at increments of 1 second as illustrated in Fig. 3-1, starting immediately before compressor startup.
- During forcible cooling, the product is energized twice at increments of 1 second as illustrated in Fig. 3-1, starting immediately after the forcible freezing switch is turned on.
- When stopped, the product holds the valve in the position where it was before stoppage.

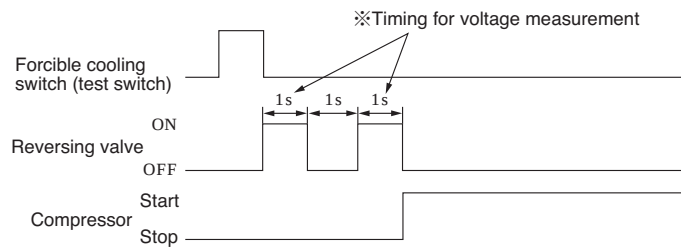


Fig. 3-1

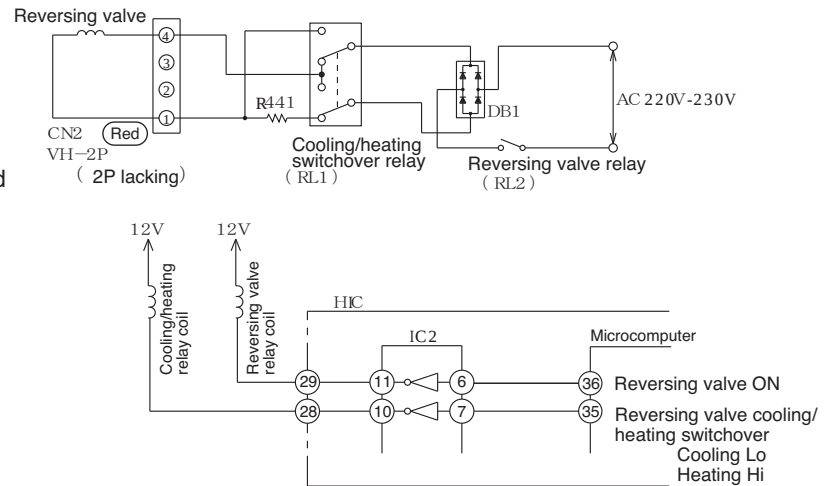


Fig. 3-2

- Before conducting an energization check of the reversing valve, detach the connector CN2, measure the resistance at both ends of the connector, and ensure that it is within the range $[400 \Omega \pm 100 \Omega]$. Check for energization only when the above test proves the product to be normal. If it is abnormal, it should be a lead wire break or a reversing valve failure.
 - Voltage when measured with a tester while the reversing valve is energized (at the timing for voltage measurement)
- ※Hold down the "test switch" of the outdoor electrical parts for at least 1 second.
Energization begins 1 second after the "test switch" is pressed.

Tester type	Connect pin ④ of the CN2 to the positive terminal of the tester. Connect pin ① of the CN2 to the negative terminal of the tester.	Connect pin ① of the CN2 to the positive terminal of the tester. Connect pin ④ of the CN2 to the negative terminal of the tester.
Analog tester	The pointer will keep swinging up to about 150 V DC, goes back to 0 V, and then swing back to about 150 V DC.	The pointer will swing in reverse direction.
Digital tester	The pointer will momentarily display a high value, go back to 0 V, and then display a large value again.	The tester will display a large negative value, go back to 0 V, and then display a negative large value.

- When the voltage is measured with a tester with the timing for voltage measurement, and if the pointer swings as illustrated in the above table, then the product should be normal. (There are dispersions with testers. Moreover, a digital tester often results in its reading being illegible. An analog tester is therefore recommended.)
- ※The product is energized only twice a second. Missing the timings will therefore result in failure to measure normal operations.
- ※If the reversing valve proper is normal, it will synchronize with the timing for voltage measurement and the reversing valve itself will click twice. If this click is heard, the reversing valve should be functioning normally.
- ※If the energization check shows an abnormality, the electrical parts should be out of order.

4. Temperature Detection Circuit

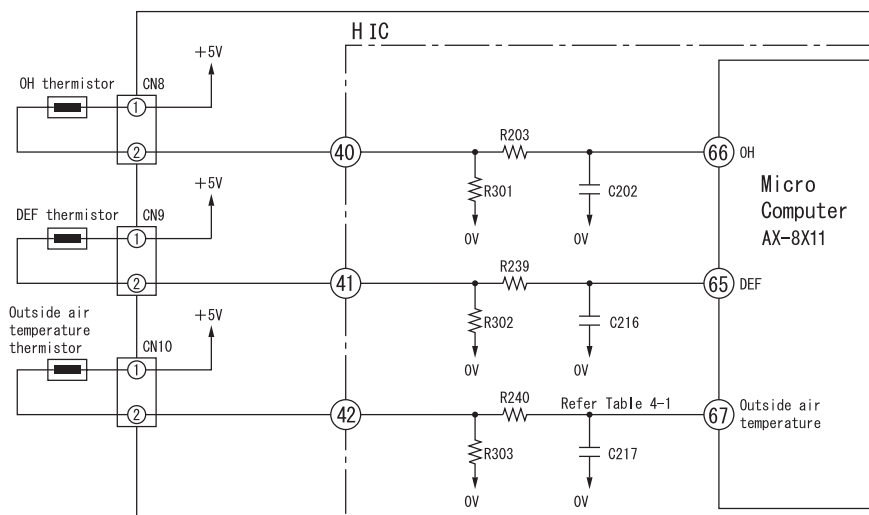


Fig. 4—1

- OH thermistor circuit detect the temperature at the surface of compressor head, DEF thermistor circuit detect the defrosting operation temperature.
- A thermistor is a negative resistor element which has characteristics that the higher(lower) the temperature, the lower(higher) the resistance.
- When the compressor is heated, the resistance of the OH thermistor becomes low and $\oplus 5V$ is divided by OH thermistor and R301 and the voltage at pin ⑥⑥ of microcomputer.
- Compare the voltage at microcomputer pin ⑥⑥ and setting value stored inside. If the value exceed the set value, microcomputer will judge that the compressor is overheated and stop the operation.
- When frost is formed on the outdoor heat exchanger, the temperature at the exchanger drops abruptly. Therefore the resistance of the DEF thermistor becomes high and the voltage at pin ⑥⑤ of micro computer drops. If this voltage becomes lower than the set value stored inside, microcomputer will enter the defrost control.
- During defrost operation, the microcomputer will transfer the defrosting condition command to indoor unit via SDO pin of interface of IF transmission output.
- The microcomputer read the outdoor temperature by Outside Air thermistor and transfer it to the indoor unit, thus controlling the compressor rotation speed according to the set value in the EEPROM of indoor unit and switching the operation mode (outdoor fan on/off etc.) to DRY mode.

Below table show the typical values of outdoor temperature in relation to the voltage.

Table 4-1

Outside Air Temperature (°C)	−10	0	10	20	30	40
Voltage at both side of R303 (V)	1.19	1.69	2.23	2.75	3.22	3.62

<Reference>

When the thermistor is open, open condition or disconnect, microcomputer pin ⑥5~⑥7 are approx. 0V;

When thermistor is shorted, they are approx. 5V and LD301 will blink 7 times.

However, an error is detected when only the OH thermistor is shorted and will enter blinking mode after 12 minutes start the compressor operation.

5. Electric expansion valve circuit

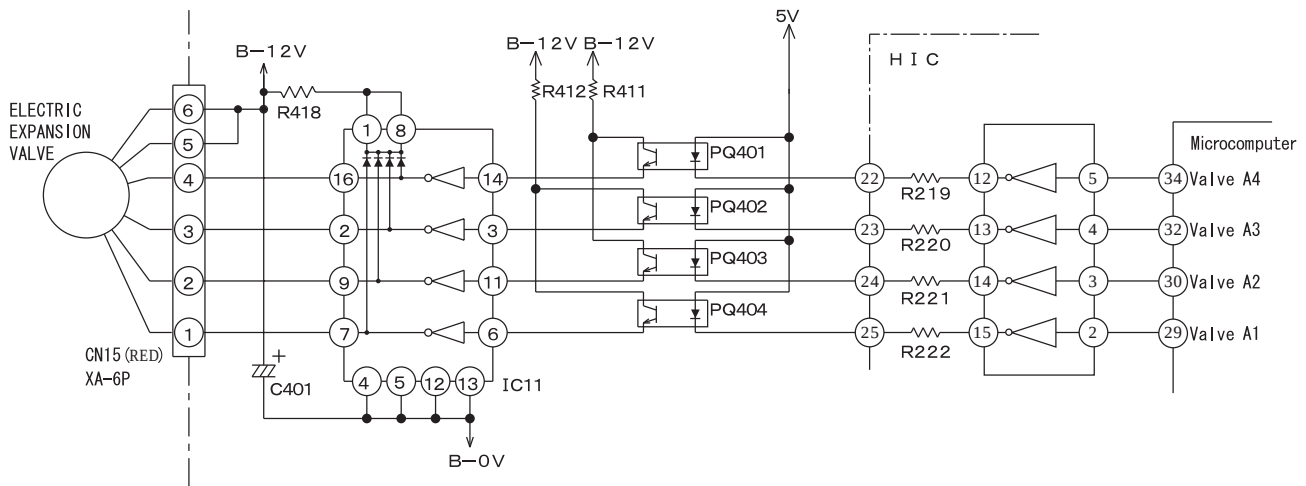


Fig. 5-1

- The electric expansion valve is driven by DC12V. Power is supplied to 1 or 2 phases of 4-phase winding to switch magnetic pole of winding in order to control the opening degree.
- Relationship between power switching direction of phase and open/close direction is shown below. When power is supplied, voltages at pins ④ to ① of CN15 are about 0.9V and 12V when no power is supplied. When power is reset, initial operation is performed for 10 or 20 seconds. During initial operation, measure all voltages at pin ④ to ① of CN15 by using a multimeter. If there is any pin with voltage that has not changed from 0.9V or 12V, expansion valve or microcomputer is broken.
- Fig. 5-2 shows logic waveform when expansion valve is operating.

Table 5-1

CN15 pin no.	Wire	Drive status							
		1	2	3	4	5	6	7	8
①	WHT	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
②	YEL	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
③	ORG	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
④	BLU	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
Operation mode									
1→2→3→4→5→6→7→8 VALVE CLOSE									
8→7→6→5→4→3→2→1 VALVE OPEN									

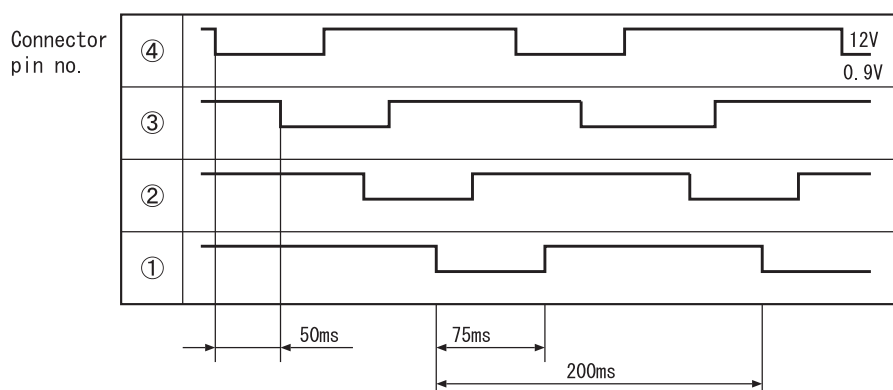


Fig. 5-2

With expansion valve control, opening degree is adjusted to stabilize target temperature by detecting compressor head temperature. The period of control is about once per 20 seconds and output a few pulse.

6. Outdoor DC fan motor control circuit

- This model is built with DC fan motor control circuit inside outdoor electrical unit.

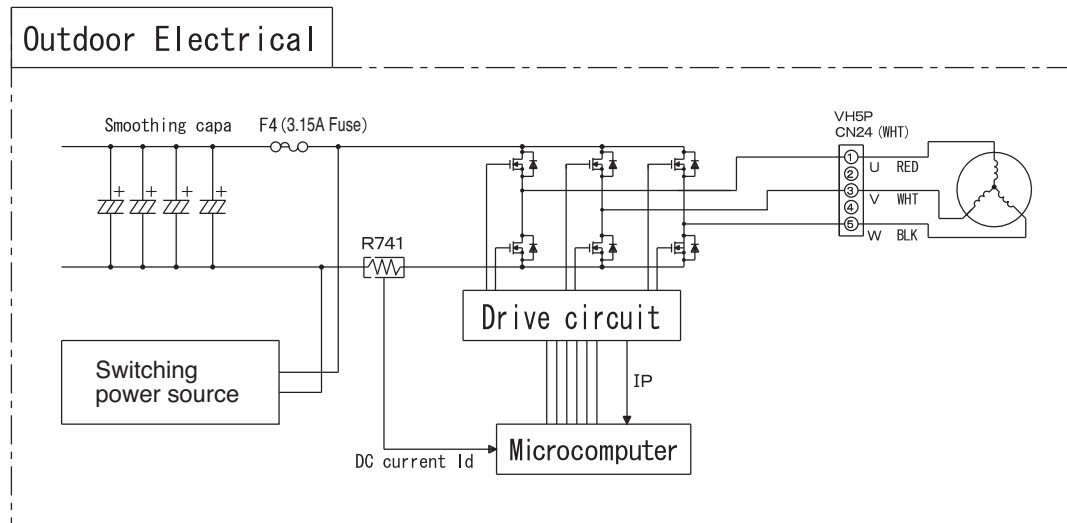


Fig 6—1

This DC fan motor is control by outdoor microcomputer that follow the operating instruction received from indoor microcomputer. The DC current that flow from R741 will presume actual operation speed and control the rotation to follow the operating instruction. Based on this DC current it will detect a over current and other fan motor failure.

(1) Fan motor speed controller during starting

Due to the interference of strong wind etc., operation movement is changed based on fan direction and rotation speed as shown below during starting of operation.

In addition, the fair wind is define as wind that blow to outside direction using Mouth Ring part. At strong and contrary wind ... The rotational speed is not controlled as to protect the equipment and fan will rotate reversely depend on the wind. Automatically start when wind condition become weak.

At contrary wind ... The rotational speed is controlled in fair wind direction after it slowly reduce the speed and finally stop.

At fair wind ... The rotational speed is controlled as it is.

At strong fair wind ... The rotational speed is not controlled as to protect the equipment and fan will rotate reversely depend on the wind. Automatically start when wind condition become weak.

(2) Fan motor speed controller during unit operating

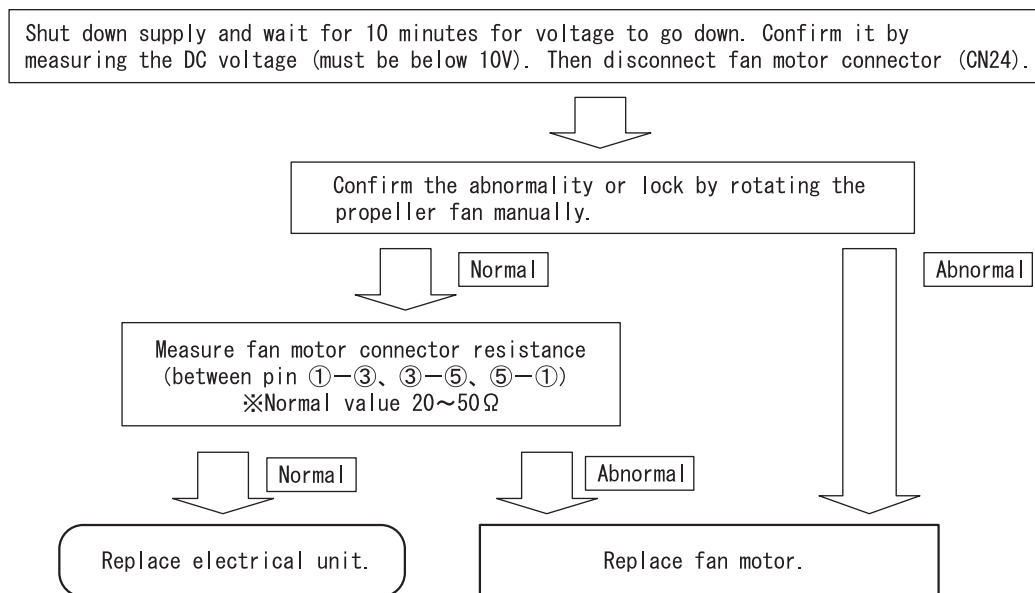
There is a case where fan rpm is reducing during rotating caused by interference of strong wind. If this condition continue in long period, fan will stop rotating. (LD301 : 11 times blinking)
The unit will restart according to control as per during start (1).

(3) Method of confirming self diagnosis LD301 lamp : 12 times blinking

If the unit stop and LD301 on the pwb blinking 12 times [fan lock stop is detected], follow below steps to confirm it.

1. Fan lock stop is detected when something has disturb the fan rotation by inserting material into propeller fan or ice has growing inside outdoor unit caused by snow.
Remove it if found something is bloking the fan.
2. Confirmed that CN24 connector is securely inserted. Fan lock stop is detected also when connector is not properly inserted. Please securely insert if found any disconnection.
3. Fan lock stop also can be detected where strong wind blown surrounding the unit.
Please confirm after restart the unit. (It may take few minutes to operate the compressor)
It is not a malfunction of electrical unit or fan motor if the unit run continuesly after restart the unit.
4. Check fan motor condition as below procedure.

[Checking Fan Motor] procedure



5. Reconnect again fan motor connector (CN24).

※Please confirm above checking procedure if found F4(3.15A fuse) blown.

If fan motor is broken, replace both electrical unit and fan motor.

Reference

※No power is supplied to the outdoor unit if F4(3.15A Fuse) is blown.

Both DC fan motor and switching power supply is using same fuse.

Caution

※Beware of electric shock due to high voltage when conducting an operation check.

Power supply for DC fan motor and compressor is common (DC260-360V).

7. Intelligent power module circuit (IPM circuit)

Fig. 7-1 shows peripheral circuits of intelligent power module (IPM).

In the diagram, U^+ , V^+ and W^+ are called the "upper arm", U^- , V^- and W^- , the "lower arm".

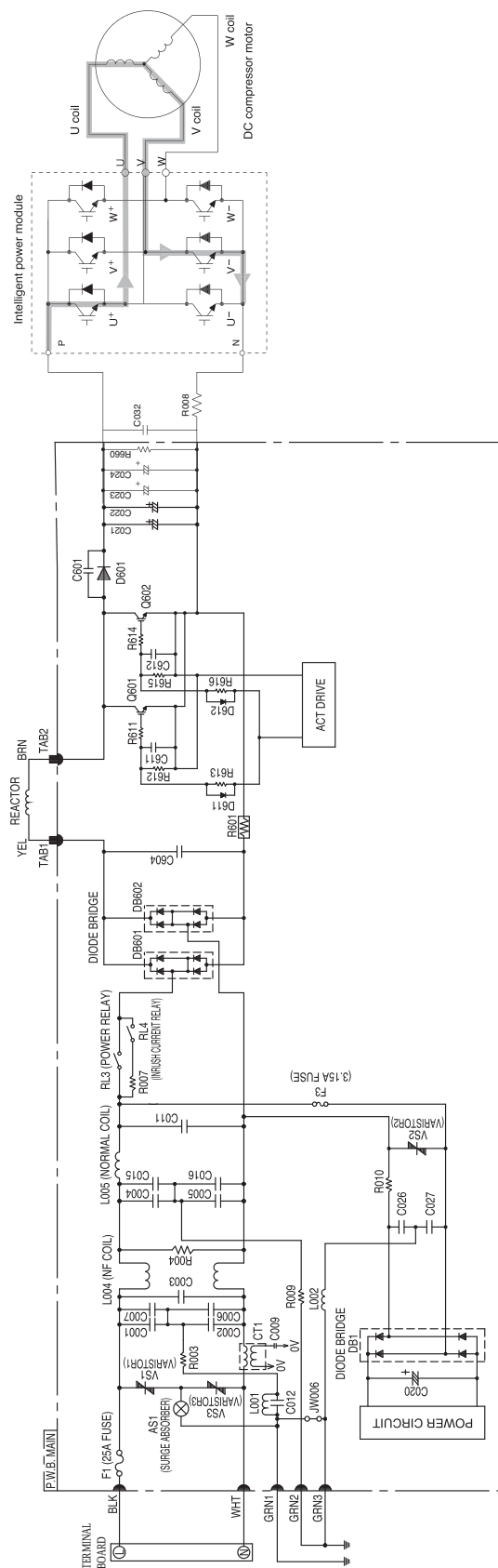


Fig. 7-1 System power module circuit (U^+ is ON, V^- is ON)

Intelligent power module switches power supply current according to position of the compressor motor rotor.

The switching order is as shown in Fig. 7-2.

At point E : U⁺ is ON, V⁻ is ON (circuit in Fig. 7-1)

At point F : U⁺ is chopped (OFF), V⁻ is ON (circuit in Fig. 7-4)

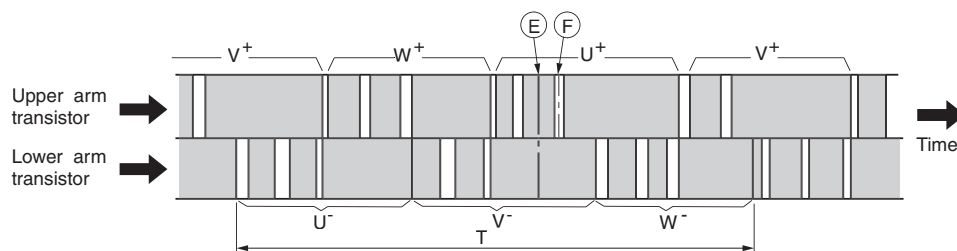


Fig. 7-2 Switching order of power module

Upper arm transistor is controlled to ON/OFF by 2.5kHz-5kHz chopper signal. Rotation speed of the compressor is proportional to duty ratio (ON time/ ON time + OFF time) of this chopper signal.

Time T in Fig. 7-2 shows the switching period, and relation with rotation speed (N) of the compressor is shown by formula below;

$$N = 60/2 \times 1/T$$

Fig. 7-3 shows voltage waveform at each point shown in Figs. 7-1 and 7-4. First half of upper arm is chopper, second half is ON, and first half of lower arm is chopper, second half is ON.

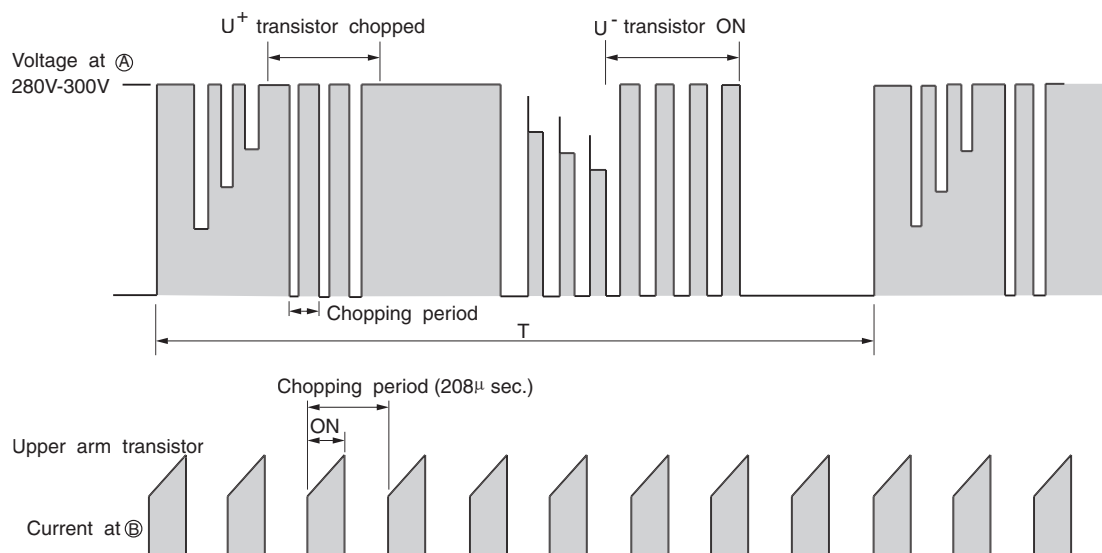


Fig. 7-3 Voltage waveform at each point

When power is supplied U⁺ → V⁻, because of that U⁺ is chopped, current flows as shown below;

- (1) When U⁺ transistor is ON: U⁺ transistor → U coil → V coil → V⁻ transistor → DC current detection resistor → Point B (Fig. 7-3)
- (2) When U⁺ transistor is OFF: (by inductance of motor coil) U coil → V coil → V⁻ transistor → U⁻ diode → Point A (Fig. 7-4)

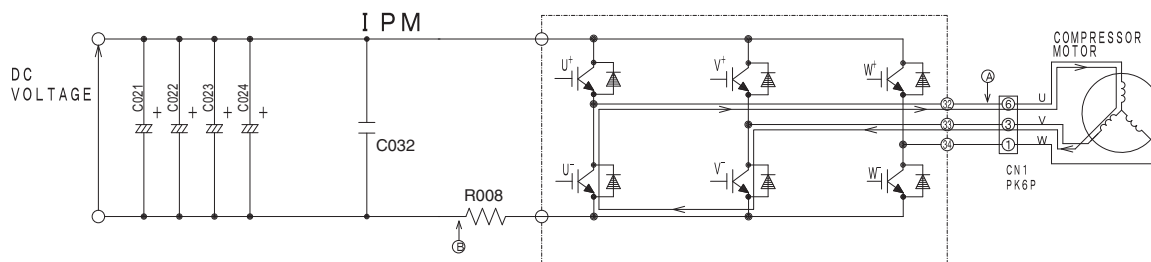


Fig. 7-4 Power module circuit (U⁺ is OFF, V⁻ is ON)

Since current flows at point ⑤ only when U⁺ transistor and V⁻ transistor are ON, the current waveform at point ⑤ becomes intermittent waveform as shown in Fig. 7-3. Since current at point ⑤ is approximately proportional to the input current of the air conditioner, input current is controlled by using DC current (I_d) detection resistor.

<Reference>

If power module is defected, self diagnosis lamps on the MAIN P.W.B. may indicate as shown below:

Table 7 -1

Self-diagnosis	Self-diagnosis lamp and mode	
I _p (peak current cut)	LD301	Blinks 2 times
Abnormal low speed rotation	LD301	Blinks 3 times
Switching incomplete	LD301	Blinks 4 times

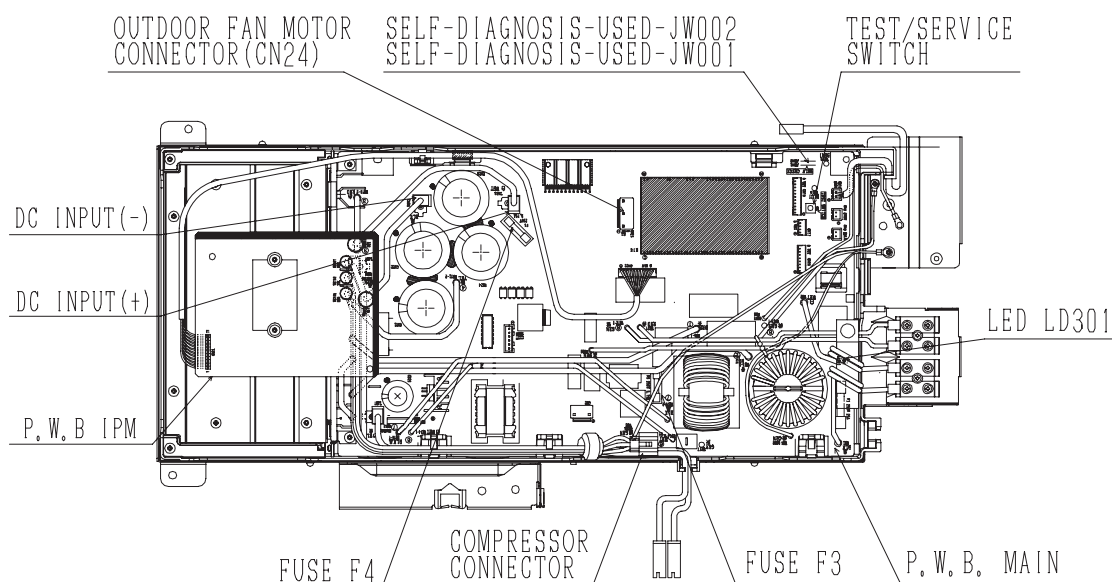
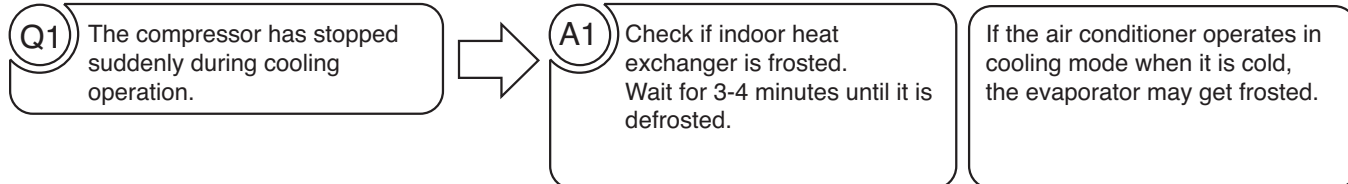


Fig. 7-5

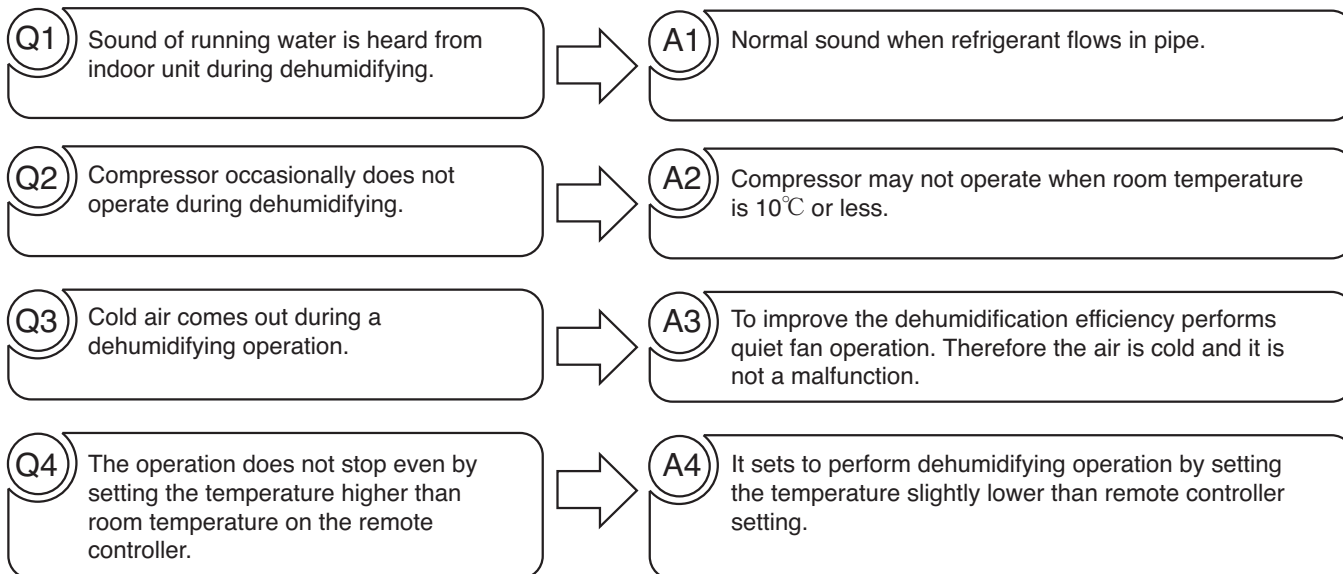
SERVICE CALL Q&A

MODEL RAK-18/25/35PSPA

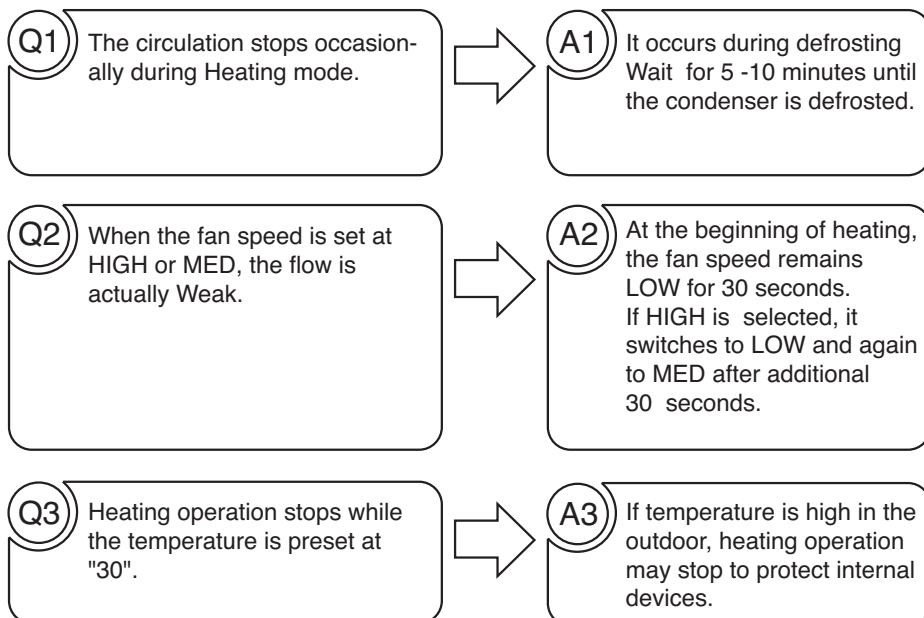
COOLING MODE



DEHUMIDIFYING MODE



HEATING MODE



AUTO FRESH DEFROSTING

Q1 After the ON/OFF button is pressed to stop heating, the outdoor unit is still working with the OPERATION lamp lighting.



A1 Auto Fresh Defrosting is carried out : the system checks the outdoor heat exchanger and defrosts it as necessary before stopping operation.

AUTO OPERATION

Q1 Fan speed does not change when fan speed selector is changed during auto operation.



A1 At this point fan speed is automatic.

Q2 How is the automatic operation mode determined?



A2 According to the room temperature and outside temperature, heating or cooling operation is automatically selected. Refer to the basic operation section.

Q3 The room temperature cannot be controlled at an automatic operation.



A3 It is automatically set as follows.
At cooling: and heating: Set at 22°C
The room temperature setting can be raised 3°C by “^” or lowered 3°C by “v”.

NICE TEMPERATURE RESERVATION

Q1 When on-timer has been programmed, operation starts before the preset time has been reached.



A1 This is because "Nice temperature reservation" function is operating. This function starts operation earlier so the preset temperature is reached at the preset time. Operation may start maximum 60 minutes before the preset time.

Q2 Does "Nice temperature reservation" function operate during dehumidifying?



A2 It does not work. It works only during cooling and heating.

Q3 Even if the same time is preset, the operation start time varies.



A3 This is because "Nice temperature reservation" function is operating. The start time varies according to the load of room. Since load varies greatly during heating, the operation start time is corrected, so it will vary each day.

Q4 When the heating operation is started, the indoor fan does not start immediately and the damper at the bottom air outlet occasionally does not open.



A4 This is because the preheating device is working. It will not start to drive the fan until the refrigerating cycle warms up and warm air blows. Wait for a while. The damper does not open either during preheating or for one minute after preheating is finished.

OTHERS

Q1

The indoor fan varies among high air flow, low air flow and breeze in the auto fan speed mode. (Heating operation)



A1

This is because the cool wind prevention function is operating, and does not indicate a fault.

The heat exchanger temperature is sensed in the auto fan speed mode. When the temperature is low, the fan speed varies among high air flow, low air flow and breeze.

Q2

Loud noise from the outdoor unit is heard when operation is started.



A2

When operation is started, the compressor rotation speed goes to maximum to increase the heating or cooling capability, so noise becomes slightly louder. This does not indicate a fault.

Q3

Noise from the outdoor unit occasionally changes.



A3

The compressor rotation speed changes according to the difference between the thermostat set temperature and room temperature. This does not indicate a fault.

Q4

There is a difference between the set temperature and room temperature.



A4

There may be a difference between the set temperature and room temperature because of construction of room, air current, etc. Set the temperature at a comfortable level for the space.

Q5

Air does not flow immediately after operation is started.



A5

Preliminary operation is performed for one minute when the power switch is turned on and heating or dehumidifying is set. The operation lamp blinks during this time for heating. This does not indicate a fault.

Q6

The unit is operated after built-in installation (behind the lattice door). It turns off for a long time and the room is not warmed (cooled).



A6

Check to see if warm (cool) air is being short-circuited behind the lattice door. A short-circuit is likely to occur when the deflector position is not appropriate, the lattice does not have a big enough opening, and/or the unit is installed in the inner part. Install the unit as near the lattice door as possible.

TROUBLE SHOOTING

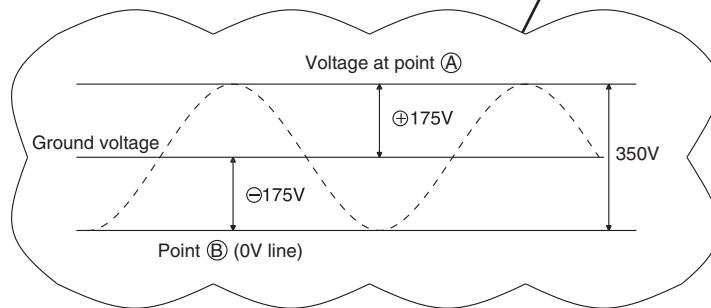
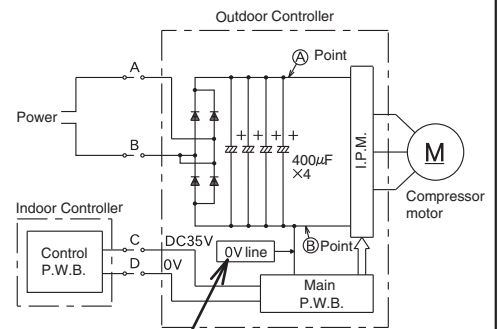
MODEL RAC-18/25/35WSPA

PRECAUTIONS FOR CHECKING



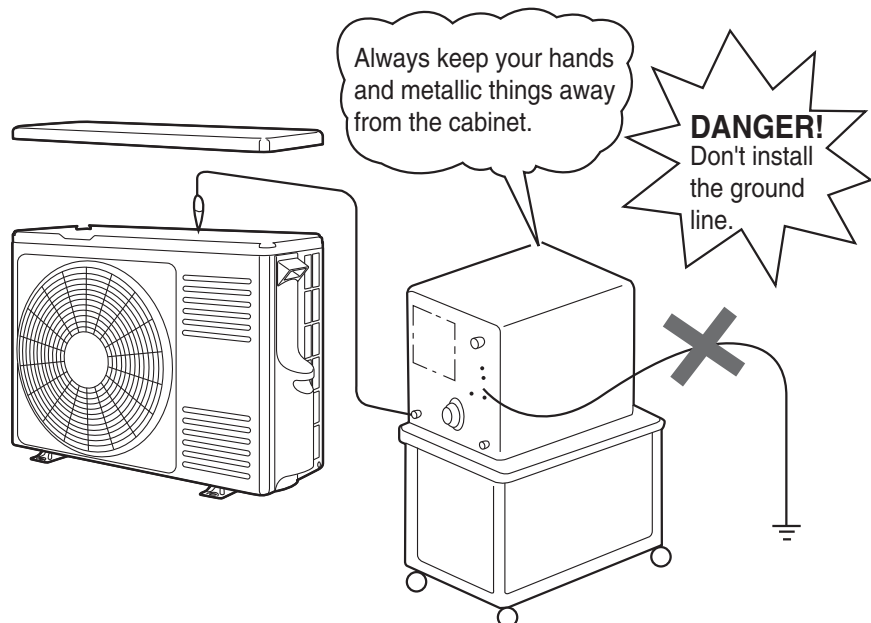
WARNING

Remember that voltage of 175 V is applied to the 0V line on the P.W.B. or the like as shown in the right diagram.



WARNING

When using an oscilloscope, never ground it. Don't forget that high voltage as noted in the figure above may apply to the oscilloscope.



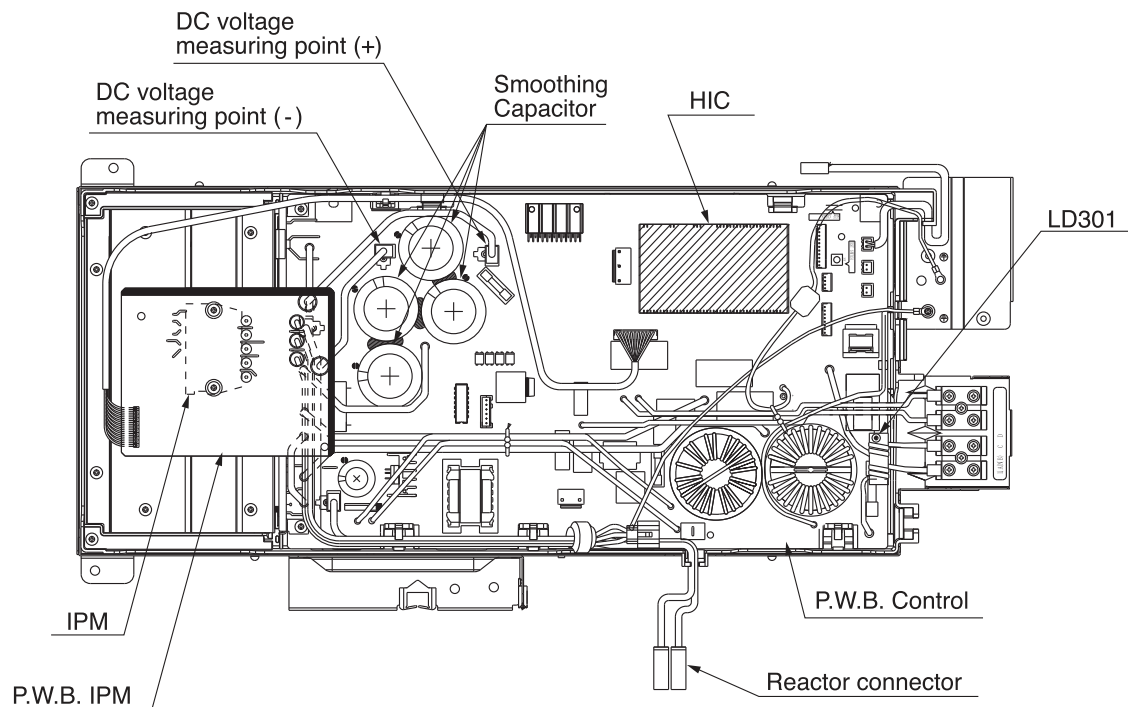
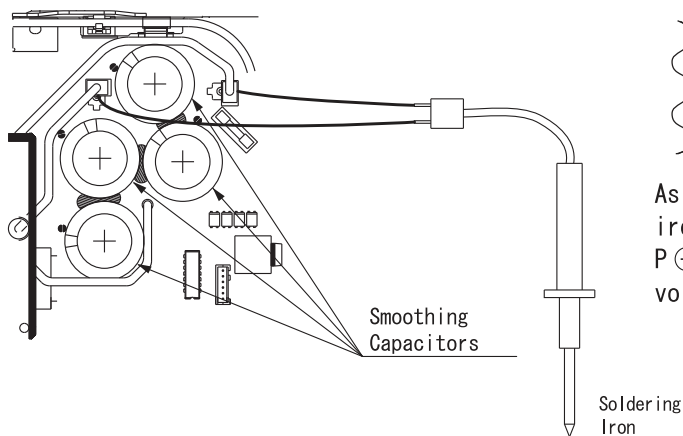
Procedures for Electrical Discharge and How to Stop Energizing the Power Circuit



Caution

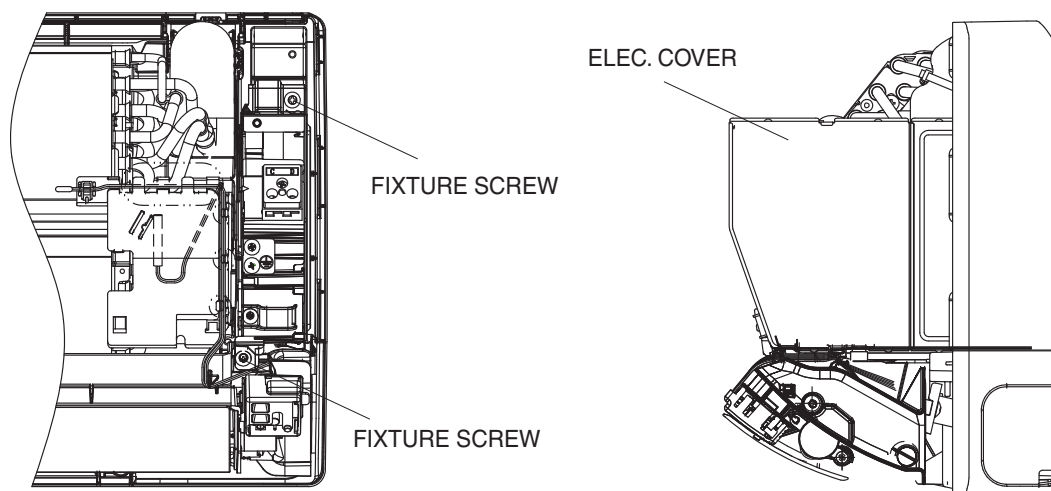
- Voltage of about 320-360V is charged between both ends of smoothing capacitors.
- During continuity check for each part of circuit in outdoor electrical parts, be sure to discharge smoothing capacitor to prevent secondary trouble.

1. Turn OFF power supply to the outdoor unit.
2. After power is turned OFF, wait for 15 minutes or more. Then remove electrical parts cover and apply soldering iron of 30 to 75W for 15 seconds or more to DC voltage ⊕ and DC voltage ⊖ terminals in order to discharge voltage in smoothing capacitors.



STRUCTURE OF AN INDOOR UNIT ELECTRIC PARTS

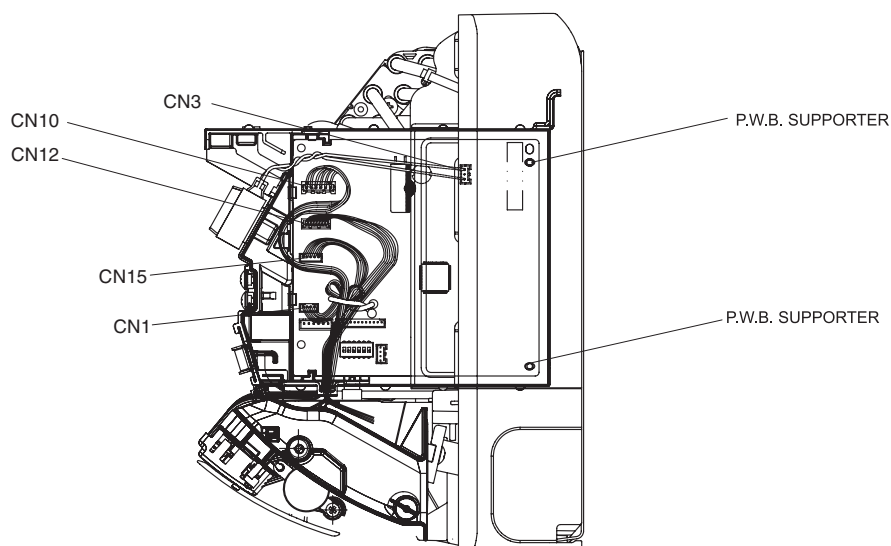
RAK-18/25/35PSPA



Removing electrical parts

1. Remove the electrical parts cover.
2. Remove the connectors from the CN1 (heat exchange thermistor), CN15 (stepping motor) and CN10 (fan motor).
3. Remove two lock screws.
4. Remove the electrical parts in the direction of arrow.

When installing the parts, use caution not to pinch any code between the part and cabinet.



Removing control P.W.B.

1. Remove the connectors from the CN12.
2. Remove the P.W.B. from the P.W.B. support.

Removing the indicating P.W.B.

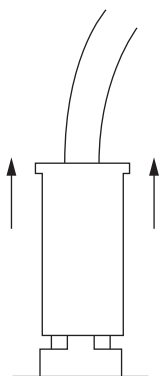
1. Remove the connector from the CN12 on the control P.W.B.
2. Remove the upper hook from the indicating P.W.B. lock resin, pull the P.W.B. forward a little and remove it.

[Other cautions]

(1) Disconnection of tab terminal receptacle

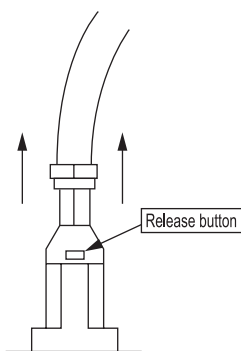
All receptacle used to connect with tab terminal are built with lock mechanism. Please take note that by using a force to pull out the receptacle without releasing the lock, can cause a damage. Furthermore, during connecting the receptacle back make sure to securely insert until end.

- Receptacle type and procedure to releasing the lock



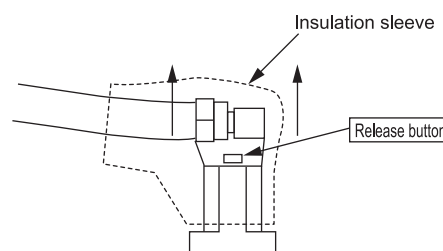
Vertical type (with plastic casing)

Pull out by holding the plastic casing.



Vertical type (without casing)

Pull out while pushing the release button.



Horizontal type (with insulation sleeve)

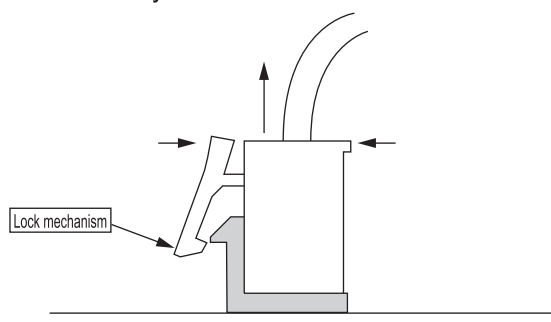
Pull out from top of insulation sleeve while pushing the release button.

(2) Disconnecting on board connector

On board connector with lock mechanism are widely used. Please take note that by using a force to pull out without releasing the lock mechanism, can cause a damage.

Furthermore, during inserting back the connector make sure it surely done.

Release lock with finger before disconnecting.



(3) Connector disconnection during discharge is prohibited

Disconnecting connector during discharge is extremely prohibited. Component on board and fan motor will damage. Proceed trouble shooting process after confirming smoothing capacitor of indoor & outdoor pwb has been discharge.

THE SUPPORT FUNCTION OF FAILURE DIAGNOSIS

No.	Function Name	Description
1	Self-diagnosis indication function <Indicating a failure on the indoor unit side> <Indicating a failure on the outdoor unit side>	- The “timer lamp” indicates a mode of failure detected on the indoor or outdoor unit side by blinking frequency. - A failure detected on the outdoor unit side will be indicated by the “timer lamp” blinking 4 times after a retry operation has been performed several times. Note: In some failure modes, only the retry operation is repeated without lamp indication. <Failure modes that will repeat a retry operation without the indoor unit lamp indication are as follows:> - OH thermistor temperature rise - Outdoor unit communication error - Power voltage abnormal - Less frequent defects - The “LD301” indicates a mode of failure detected on the outdoor unit side by blinking frequency. Upon failure detection, the outdoor unit will shut down and the LD301 continues to blink until the unit is reset. (In the event of communication errors, the LD301 continues to blink until communication is restored.)

TROUBLESHOOTING WHEN TIMER LAMP BLINKS.

Model: RAK-18/25/35PSPA

Perform troubleshooting according to the number of times the indoor timer lamp and outdoor LD301 blink.

SELF-DIAGNOSIS LIGHTING MODE

Model: RAK-18/25/35PSPA

Lamp blinking mode	Main defective
 2 sec.  Once	Reversing valve defective
 2 sec.  2 Times	Forced operation of outdoor unit
 2 sec.  3 Times	Indoor/Outdoor interface defective
 2 sec.  4 Times	Outdoor defective indication
 2 sec.  9 Times	Indoor sensor defective
 2 sec.  10 Times	Abnormal rotating numbers of DC fan motor
※1  2 sec.  12 Times	Interface voltage error
 2 sec.  13 Times	IC401 defective

( --- Lights for 0.35 sec. at interval of 0.35 sec.)

<Cautions>

- (1) If the interface circuit is faulty when power is supplied, the self-diagnosis display will not be displayed.
- (2) If the indoor unit does not operate at all, check if the connecting cable is connected to the outdoor unit.
- (3) To check operation again when the timer lamp is blinking, you can use the remote control for operation (except for mode mark ※1).

SELF-DIAGNOSIS LIGHTING MODE

MODEL RAC-18/25/35WSPA

⚠ DANGER (DC350V)

- SWITCH OFF POWER SOURCE TO THE OUTDOOR UNIT AT LEAST 10 MINUTES BEFORE START THE SERVICING WORK.
- MAKE SURE THE LEVEL DC VOLTAGE BETWEEN TAB5(WHT+) AND TAB4(BLK-) IS LESS THAN 10V.
- DO NOT TOUCH ANY OTHER PARTS EXCEPT TEST(SERVICE) SWITCH WHEN SERVICE OPERATION IS CONDUCTED.

DURING STOP	
LD301 (RED)	CONTENTS
LIGHT	NORMAL OPERATION
2 SEC LIGHTING AND 0.3 SEC LIGHTS OUT REPETITION	OVERLOAD OPERATION(NORMAL OPERATION)

DURING STOP	
SELF-DIAGNOSIS BLINKING MODE ☒ :BLINK ☐ :OFF	
LD301 (RED)	SELF-DIAGNOSIS CONTENTS

LD301 (RED)	SELF-DIAGNOSIS CONTENTS	MAIN CHECK POINT	HOW TO REPAIR
	NORMAL STOP (STOPPED BY INDOOR THERMOSTAT OR MAIN OPERATION OFF)	1. NO NEED TO CHECK	1. NOT ANY MALFUNCTION
ONCE	FAN MODE OPERATION, RESET STOP	1. INDOOR AIR CLEAN OPERATION 2. OTHER CASE	1. NOT ANY MALFUNCTION 2. CHANGE ODU CONTROLLER
2 TIMES	PEAK CURRENT OUT	1. ODU CONTROLLER DEFECTIVE 2. OTHER CASE	1. CHANGE ODU CONTROLLER 2. CHECK THE COMPRESSOR
3 TIMES	ABNORMAL LOW SPEED ROTATION	1. ODU CONTROLLER DEFECTIVE 2. COMPRESSOR ABNORMAL LOAD	1. CHANGE ODU CONTROLLER 2. CHECK THE COMPRESSOR
4 TIMES	SWITCHING FAILURE	1. COMPRESSOR CONNECTOR OPEN 2. COMPRESSOR ABNORMAL LOAD 3. ODU CONTROLLER DEFECTIVE	1. INSERT THE CONNECTOR 2. CHECK THE COMPRESSOR 3. CHANGE ODU CONTROLLER
5 TIMES	OVERLOAD LOWER LIMIT CUT	1. OBSTACLE SURROUND 2. OTHER CAUSE	1. REMOVE THE OBSTRUCTION 2. CHECK CYCLE PIPE
6 TIMES	OH THERMISTOR TEMPERATURE RISE	1. DUE TO OPEN CONNECTOR 2. LEAKAGE OF REFRIGERANT 3. OTHER CAUSE	1. INSERT THE CONNECTOR 2. CHECK THE CYCLE PIPE AND RECHARGE THE REFRIGERANT 3. CHANGE ODU CONTROLLER
7 TIMES	THERMISTOR ABNORMAL	1. CONNECTOR INSERT MISS 2. OPEN CIRCUIT/SHORT CIRCUIT OF THERMISTOR WIRE 3. ODU CONTROLLER DEFECTIVE	1. INSERT PROPERLY 2. CHANGE THE THERMISTOR 3. CHANGE ODU CONTROLLER

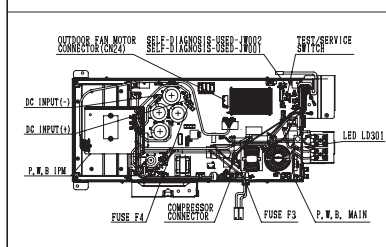
LD301 (RED)	SELF-DIAGNOSIS CONTENTS	MAIN CHECK POINT	HOW TO REPAIR
9 TIMES	COMMUNICATIONS ERROR	1. F CABLE WISS CONNECTION 2. F CABLE DISCONNECTION 3. ODU CONTROLLER DEFECTIVE	1. F CABLE CONNECT PROPERLY 2. CHANGE THE F CABLE 3. CHANGE ODU CONTROLLER
10 TIMES	ABNORMAL POWER SOURCE	1. REACTOR IS UNCONNECTED 2. ABNORMAL AC INPUT 3. AC INPUT IS NORMAL	1. CONNECT REACTOR PROPERLY 2. CONNECT TO NORMAL AC POWER SOURCE 3. CHANGE ODU CONTROLLER
11 TIMES	ODU FAN STOP BY STRONG REVERSE WIND	1. OUTDOOR FAN STOP BY STRONG REVERSE WIND	1. IT WILL RE-START AFTER THE WIND BECOME WEAK
12 TIMES	ODU FAN STOP BY STRONG REVERSE WIND	1. OUTDOOR FAN STOP BY STRONG REVERSE WIND	1. AUTOMATICALLY RE-START AFTER WIND BECOME WEAK
13 TIMES	EEPROM READ ERROR	-CHANGE OUTDOOR UNIT CONTROLLER	
14 TIMES	ACTIVE VOLTAGE ABNORMAL	1. ABNORMAL OUTDOOR CONTROLLER 2. ABNORMAL COMPRESSOR LOAD	1. CHANGE ODU CONTROLLER 2. CHECK THE COMPRESSOR
16 TIMES	HIGH LOAD STOP	1. SERVICE VALVE CLOSE 2. OBSTACLE SURROUND 3. CLOGGED FILTER IN INDOOR UNIT CAUSE	1. CHECK SERVICE VALVE 2. REMOVE THE OBSTRUCTION 3. CHECK FILTER

SELF OPERATION

TO COLLECT REFRIGERANT FROM INDOOR UNIT AND STORE IT AT OUTDOOR UNIT

1. SWITCH OFF POWER SOURCE AND THEN SWITCH IT ON AGAIN, WAIT FOR 1 MINUTE.
2. PRESS AND HOLD TEST/SERVICE SWITCH FOR 1 SEC. OR MORE TO START OUTDOOR UNIT IN COOLING OPERATION. IN ORDER TO PREVENT PARTS FROM DAMAGE, DO NOT OPERATE THE OUTDOOR UNIT FOR MORE THAN 5 MINUTES.
3. PRESS AND HOLD TEST/SERVICE SWITCH FOR 1 SEC. OR MORE TO STOP THE SERVICE OPERATION.
4. REPEAT STEP 1 TO 3 IF SERVICE OPERATION NEED TO BE REPEATED.

STRUCTURE OF ELECTRICAL



IN CASE OF THE DIFFICULT TO JUDGE THE ABNORMAL WITH OUTDOOR ELECTRIC BOX OR THE COMP., BLINKING IN 2, 3, 4 OR 5 TIMES AT SELF-DIAGNOSIS IN THE STOPPING STATUS, PLEASE PERFORM THE MEGA CHECK AND CONFIRM THE INSULATION WITH THE COMPRESSOR, AS THERE IS NOT ABNORMAL FOR THE INSULATION WITH COMPRESSOR, PLEASE PERFORM [SELF-CHECK].

SELF-DIAGNOSIS METHOD

1. SWITCH OFF POWER SOURCE.
 2. CUTTING [JW001]BY NIPPER OR BEING SHORT CIRCUIT BETWEEN [JW001]AND[JW002](FASTEN TOGETHER WITH A WIDE MOUTH CLIP).
 3. PUT THE POWER ON AND OPERATE INDOOR UNIT WITH VENTILATION MODE.
 4. PRESS TEST/SERVICE SWITCH FOR 1 SECOND OR MORE (WITHIN 3 MINUTES).
 5. SELF-CHECK RESULT WILL DISPLAY AT LD301. SEE THE ABOVE TABLE (SELF-CHECK/DIAGNOSIS RESULT) FOR THE DETAIL.
 6. SWITCH OFF POWER SOURCE THEN RELEASE BACK JW001 AND JW002 TO ORIGINAL CONDITION (NO SHORT CIRCUIT CONDITION).
- IF STEP NO. 6 NOT CARRIED OUT, THE SYSTEM WILL NOT OPERATE PROPERLY UNTIL 3 MINUTES HAS LAPSED AFTER RESTORE THE POWER SUPPLY.

[SELF-CHECK] DIAGNOSIS RESULT	
SELF-DIAGNOSIS BLINKING MODE ☒ :BLINK	
LD301 (RED)	SELF-DIAGNOSIS CONTENTS
ONCE	NON DEFECTIVE FOR ODU CONTROLLER
2 TIMES	FOUND PEAK CURRENT ERROR
7 TIMES	COMPRESSOR CURRENT ABNORMAL
10 TIMES	ABNORMAL DC VOLTAGE
13 TIMES	EEPROM READING ERROR

HOW TO REPAIR

- CHANGE THE COMPRESSOR
- CHANGE ODU CONTROLLER
- CHECK THE COMPRESSOR CONNECTOR AND CONNECT IT PROPERLY
- CHECK THE COMPRESSOR IF ABOVE ARE OK, CHANGE THE ODU CONTROLLER
- REACTOR IS DISCONNECTION, CONNECT IT PROPERLY
- IF AC VOLTAGE INPUT ABNORMAL (OVER STANDARD VOLTAGE:10%), FOLLOW STANDARD AC VOLTAGE INPUT
- IF AC VOLTAGE INPUT IS NORMAL (WITHIN10%) - CHANGE P, W, B
- CHANGE ODU CONTROLLER

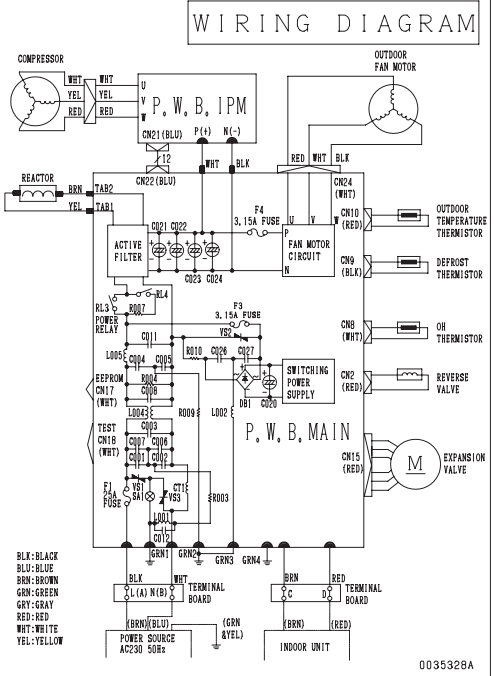
OUTDOOR FAN MOTOR INSPECTION(SELF-DIAGNOSIS)

1. SWITCH OFF POWER SOURCE.
2. DISCONNECT OUTDOOR FAN MOTOR CONNECTOR FROM CONNECTOR, CN24 OF P, W, B, MAIN.
3. ROTATE THE OUTDOOR FAN SHAFT TO CONFIRM THE FAN MOTOR MOVEMENT EITHER NORMAL OR ABNORMAL.
4. CHECK RESISTANCE VALUE BETWEEN PIN TERMINAL AT CONNECTOR AREA, THE RESISTANCE BETWEEN PIN TERMINAL SHOULD BE WITHIN 20 TO 50 Ohm.

■ RECONNECT BACK THE OUTDOOR FAN CONNECTOR ONCE FINISH DO INSPECTION.

OTHER INSPECTION:

- 1. DIAGNOSIS FOR REVERSE VALVE OPERATION ERROR
- CHECK REVERSE VALVE WIRE CONNECTION EITHER WIRE BROKEN OR NOT, IF OK, CHECK FUSE F3, IF BROKEN, REPLACE FUSE OR P, W, B.
- 2. DIAGNOSIS FOR COMMUNICATION SIGNAL ERROR OR OUTDOOR NOT FUNCTIONAL-CHECK WIRING CONNECTION BETWEEN INDOOR AND OUTDOOR.



0035328A

SELF-DIAGNOSIS MEMORY FUNCTION

Failure modes are stored in the nonvolatile memory of indoor unit and shall be redisplayed by remote controller.

This function is useful in checking the failure modes either during switching OFF the power or restarting the device without checking the number of indication lamp blinking. Remote controller can redisplay up to last 5 failure modes from the memory. However, failure modes which are rarely to occur are also stored in the memory which caused the numbers of failure more than 5. Thus, for some failure modes which are unable to retrieve because of remote controller limit to redisplay only 5 failure modes, it can be found by clearing up the memory first then recheck the memory content again during the visit at the customer place.

< How to redisplay failure diagnosis >

1. Turn the circuit breaker OFF.
2. Set the remote controller to OFF condition, indicated by **OFF** on the display.
3. By pressing **MODE** (MODE) button on the remote controller, set to Cooling operation indicated by  (COOL).
4. Turn the circuit breaker ON.
5. Set the room temperature setting on the remote controller to 32°C by pressing the (TEMP  or ) button.
6. Set the fan speed with the  (FAN SPEED) button according to the desired failure information. (Refer to the corresponding table below)

Fan speed settings for failure data	
Fan Speed	Data
AUTO 	Newest
HI 	Second newest
MED 	Third newest
LOW 	Fourth newest
SILENT 	Oldest

7. While directing the remote controller towards the receiver of the indoor unit, press (TEMP ) button and  (START/STOP) button simultaneously. (The remote controller perform signal transmission with the device.)
8. The device beeps [Pi-] to indicate that it has just received the signal to redisplay the failure mode.
9. Direct the remote controller towards the receiver of indoor unit (within 2 meters in front of indoor unit) and press the  (INFO) button. Wait for 2 seconds for signal transmission. An error code will be displayed on the remote controller display.

< How to clear the troubleshooting data >

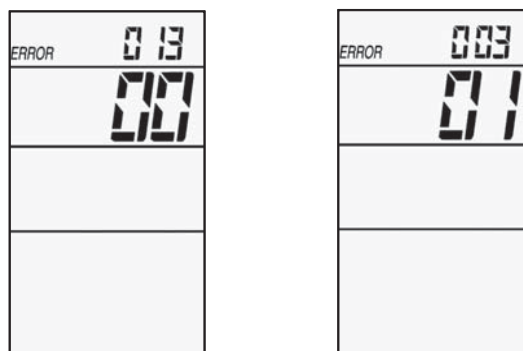
1. Redisplay the troubleshooting status. (See the above procedure.)
2. Turn the circuit breaker OFF.
3. By pressing **MODE** (MODE) button on the remote controller, set to Heating operation indicated by  (HEAT).
4. Turn the circuit breaker ON.
5. Set the room temperature setting on the remote controller to 16°C by pressing the (TEMP  or ) button.
6. While directing the remote controller towards the receiver of the indoor unit, press (TEMP ) button and  (START/STOP) button simultaneously. (The remote controller perform signal transmission with the device.)
7. The product beeps for a second [Pi-] to indicate that it has just received the signal. The data has now been cleared.

< How to display error code in case of failure just occurs >

If timer lamp  of the indoor unit blinking and operation stops, please perform below procedures.

1. Direct the remote controller towards the receiver of indoor unit (within 2m in front of the indoor unit) and press  (INFO) button.
2. Wait for 2 seconds for signal transmission.
3. Indication of error code will be shown on the remote controller display for 10 seconds.

For example :



	TIMER LAMP BLINKING	LD301 BLINKING	CODE	MEANING	DETAILS	MAIN CHECK POINT
INDOOR	-	-	000 00	Normal		
	1 time	-	001 00	Refrigerant cycle fault	When the indoor heat exchanger temperature is too low in the heating mode or it is too high in the cooling mode.	1. Reversing valve defective 2. Heat exchanger thermistor disconnected. (only in heating mode)
	2 times	-	-	Outdoor unit is under forced operation.	It is not failure. Outdoor unit is in forced operation or balancing operation after forced operation.	1. Electrical parts in the outdoor unit.
	3 times	-	003 00	Communication error between indoor and outdoor units.	Interface signal from the outdoor unit is interrupted.	1. Indoor interface circuit 2. Outdoor interface circuit
	9 times	-	009 00	Indoor thermistor	Room thermistor or heat exchanger thermistor is opened circuit or short circuit.	1. Room thermistor 2. Heat exchanger thermistor
	10 times	-	010 00	Abnormal rotating numbers of DC fan motor	Overcurrent is detected at the DC fan motor of the indoor unit.	1. Indoor interface circuit 2. Outdoor interface circuit 3. Indoor control P.W.B
	13 times	-	013 00	IC401 data reading error	When data read from IC401 or IC402 is incorrect.	1. IC401 or IC402 abnormal
OUTDOOR	4 times	2 times	002 01	Peak current cut	Over current is detected.	1. Compressor 2. P.W.B.s
	4 times	3 times	003 01	Compressor abnormal low speed rotation	Position detection signal is not input during operation.	1. P.W.B.s 2. Compressor
	4 times	4 times	004 01	Compressor switching failure	Fail to switch from initial low frequency sync to position detection sync.	1. P.W.B.s 2. Compressor
	4 times	5 times	005 01	Overload lower limit cut	Overload condition still persisting even when rotation speed is below the lower rpm limit.	1. Outdoor unit is exposed to direct sunlight or its air flow blocked. 2. Fan motor 3. Fan motor circuit 4. The voltage is extremely low.
	-	6 times	006 01	OH thermistor temperature rise	OH thermistor is operating.	1. Leak of refrigerant 2. Compressor 3. OH thermistor circuit 4. Fan motor 5. Fan motor circuit
	4 times	7 times	007 01	Abnormal outdoor thermistor	Thermistor is opened or shorted.	1. Thermistor 2. Connection of thermistor is faulty 3. Thermistor circuit
	4 times	8 times	008 01	Acceleration defective		
	-	9 times	009 01	Communication error	When indoor unit is not connected, it blinks similarly, not malfunction.	1. Cable is wrong connected 2. Cable is open 3. Interface circuit between indoor and outdoor unit
	-	10 times	010 01	Abnormal power source	Power supply voltage is incorrect.	1. Power supply voltage 2. Receptacle of wire for P.W.B.IPM is not properly inserted
	-	11 times	011 01	Fan stop for strong wind	Fan motor load is too heavy or rotation disturbed by wind blow.	1. Fan motor 2. Outdoor condition (wind)
	4 times	12 times	012 01	Fan motor fault	Outdoor fan rpm is not rotate as intended rpm.	1. Fan motor 2. Fan motor circuit
	4 times	13 times	013 01	EEPROM reading error	Microcomputer cannot read the data in EEPROM.	1. P.W.B main
	4 times	14 times	014 01	Active converter defective	Over voltage is detected, compressor abnormal load.	1. P.W.B.s 2. Compressor
	4 times	15 times	015 01	Abnormal PWB circuit	Active circuit abnormal.	1. P.W.B.s
	-	16 times	016 01	Software peak current cut		

< Cautions >

This function is effective only once immediately after the power is turned on. It will not work if you have performed another remote control operation beforehand. Note also that it may not function in response to a procedure other than the above. (If it does not work, turn off the power, turn it back on and repeat the procedure.)

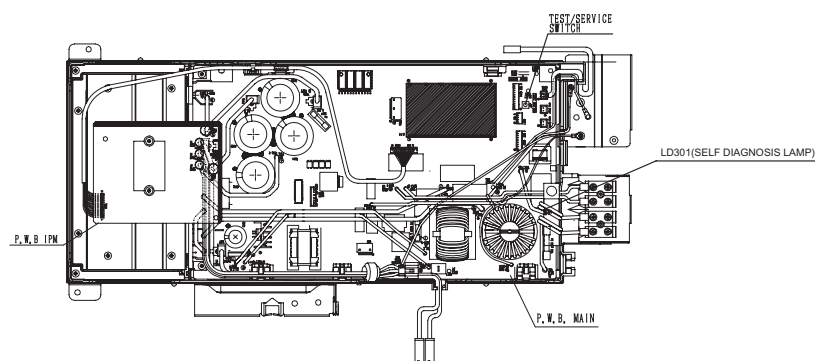
If the memory stores nothing, performing a redisplay operation will not blink the lamp.

For a normal operation, turn off the power and turn it back on. After the above operation, the product will not receive a remote control signal normally.

After clearing the troubleshooting data, turn off the power. (If you do not turn off the power, the product will become unresponsive to remote control signals.)

OUTDOOR UNIT

Remove the compressor connector.



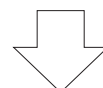
If your first attempt fails, wait 3 minutes (for the unit to re-start) and check the self-diagnosis lamp status again.

With the unit set in the operating state, press the cooling/heating/dehumidify button. Does the unit operate for approximately 2 seconds (the LD301 coming on) and then stop due to a failure of switching (the lamp blinking 4 times)?

Yes

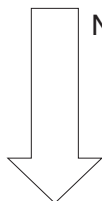
- Check the drive circuit (IPM) using the PRD checker.
- Check the position sensor circuit.

Normal



Check the refrigerating cycle.

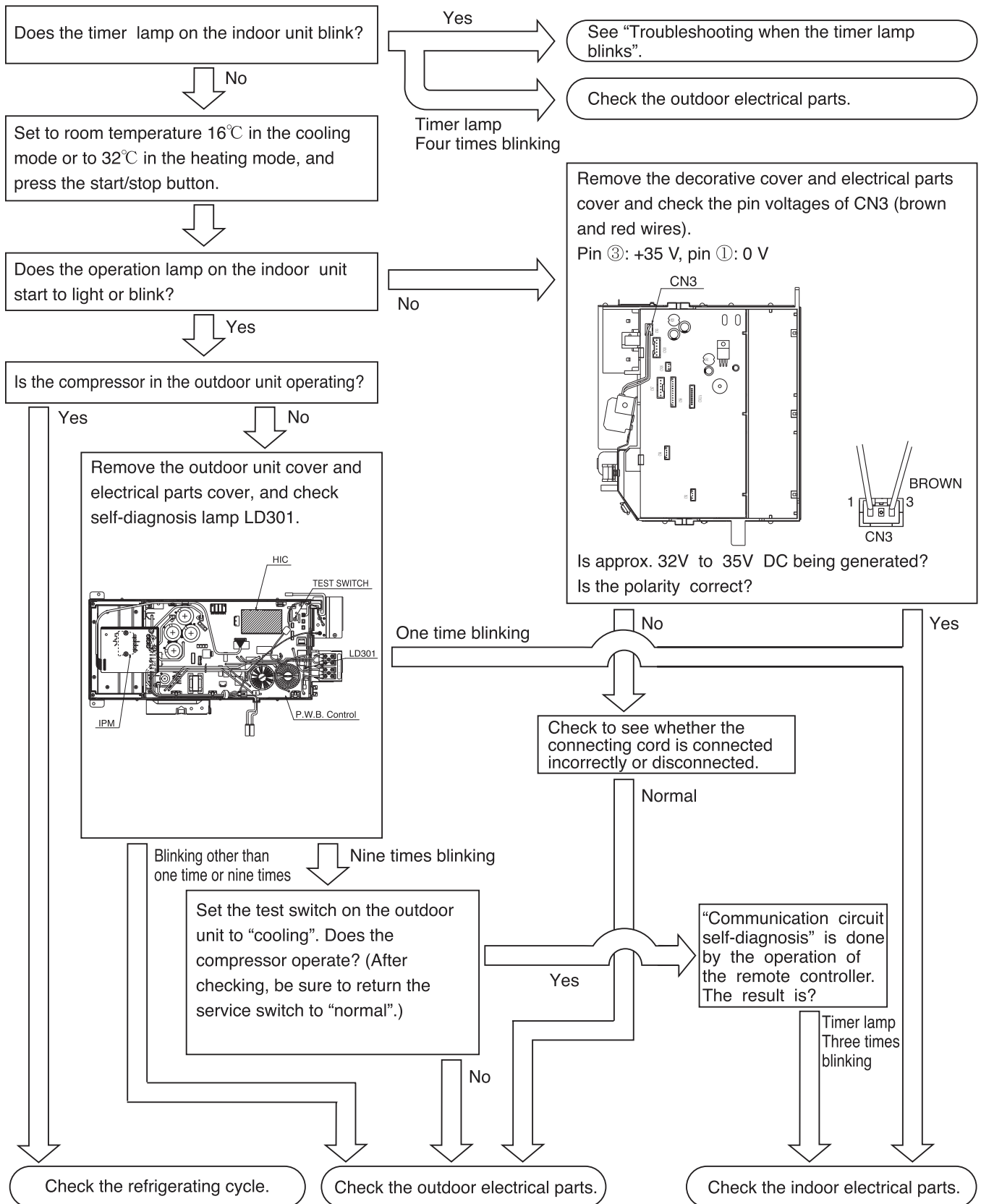
No



Check outdoor electrical parts.

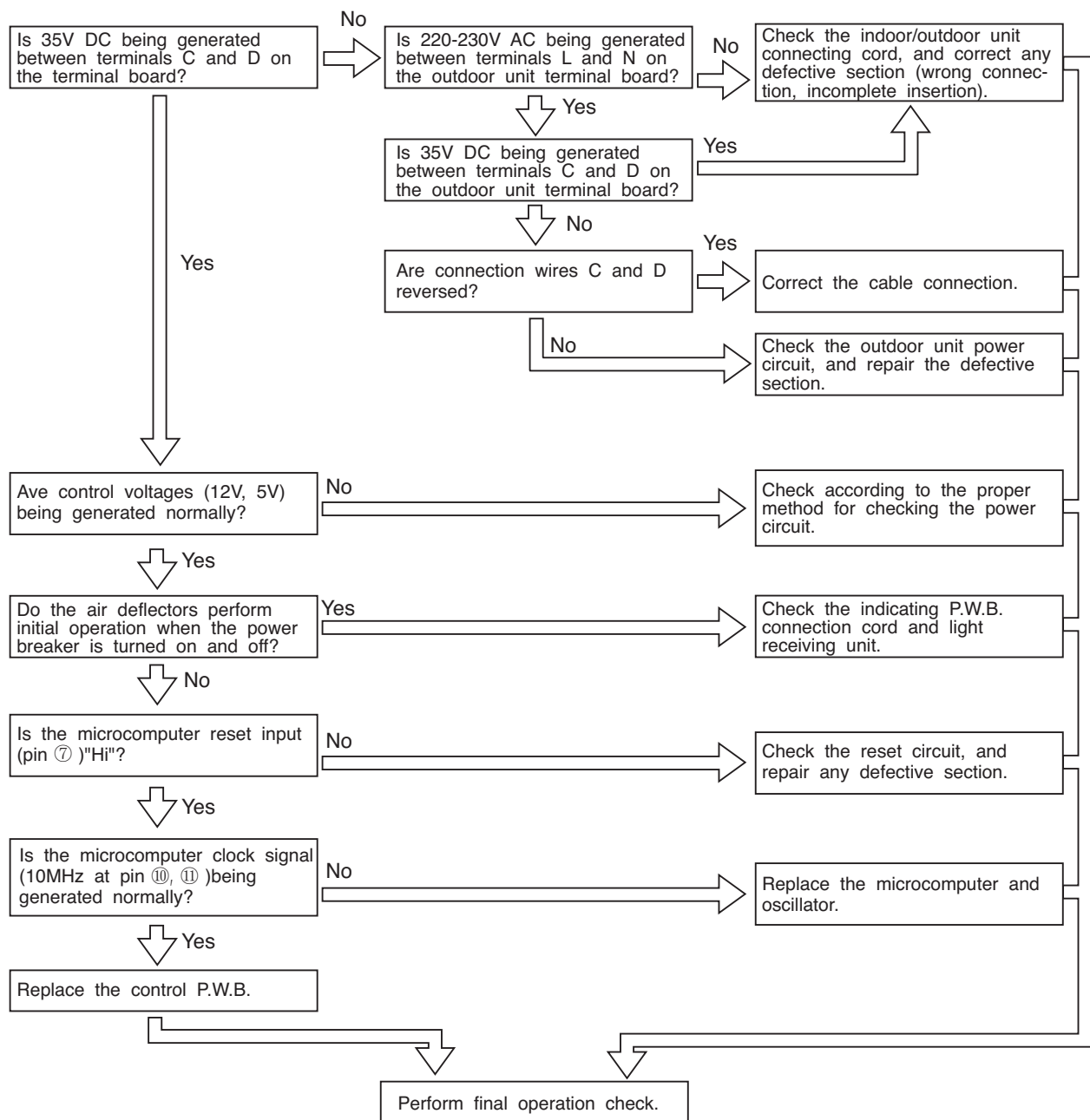
CHECKING THE INDOOR/OUTDOOR UNIT ELECTRICAL PARTS AND REFRIGERATING CYCLE

MODEL RAK-18/25/35PSPA;RAC-18/25/35WSPA

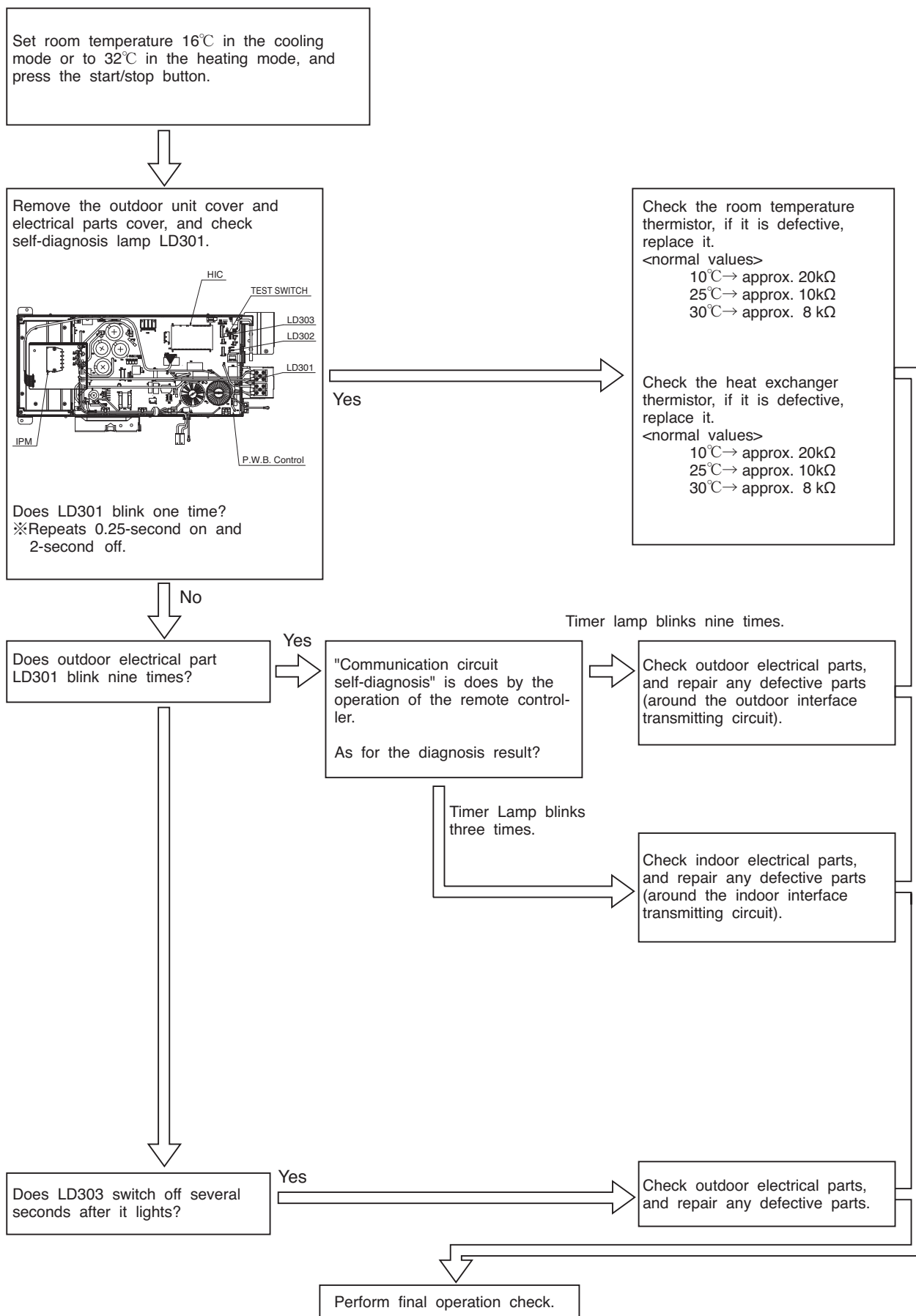


CHECKING THE INDOOR UNIT ELECTRICAL PARTS

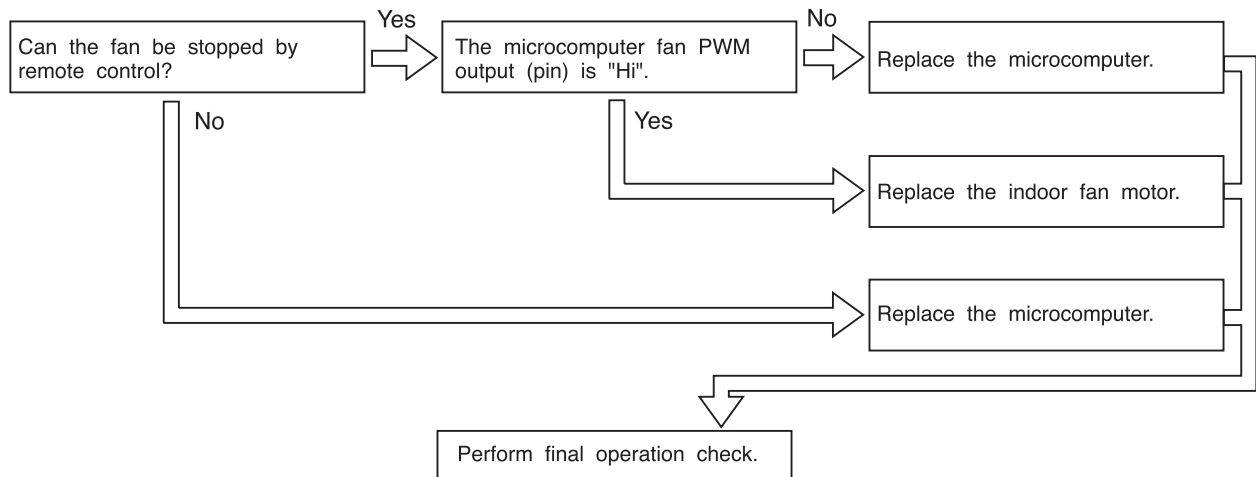
1. Power does not come on (no operation)



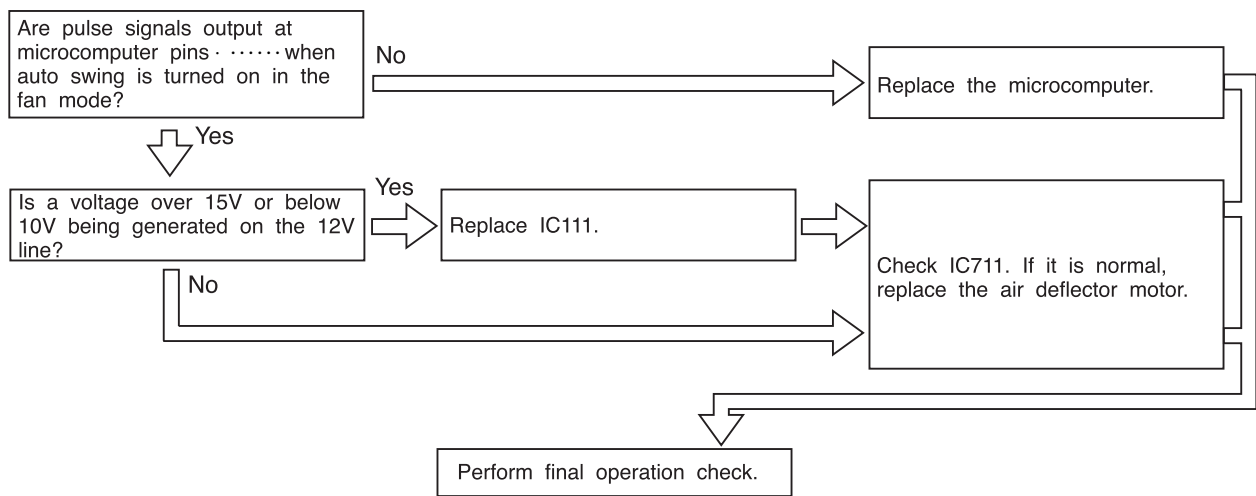
2. Outdoor unit does not operate (but receives remote infrared signal)



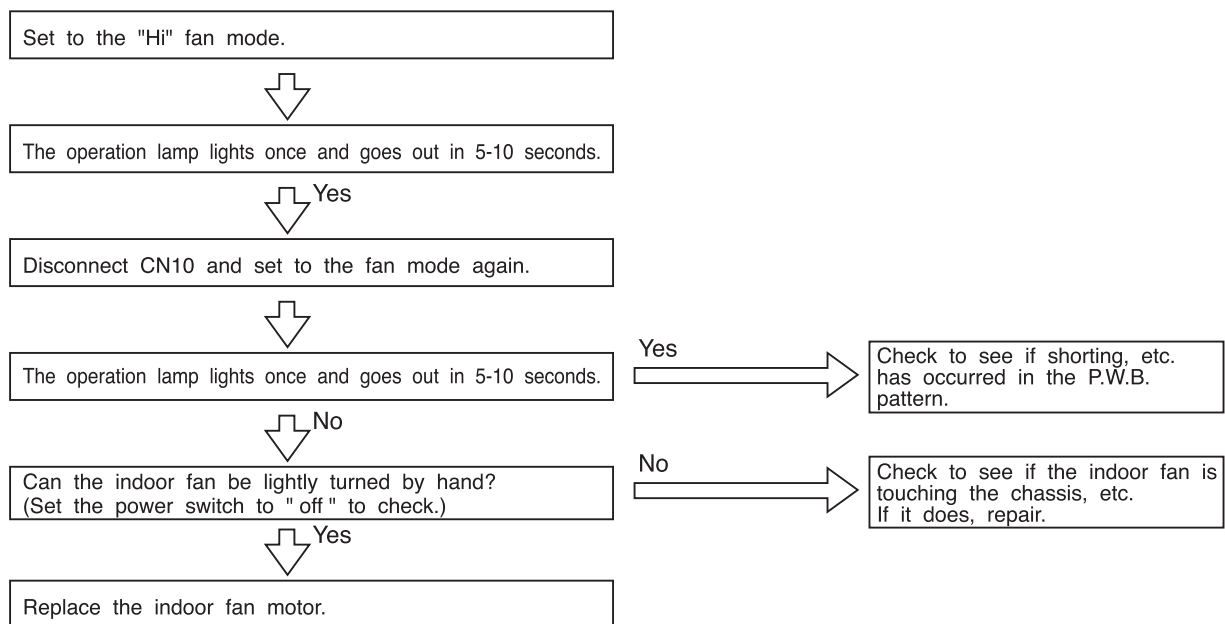
3. Indoor fan speed does not change (others are normal)



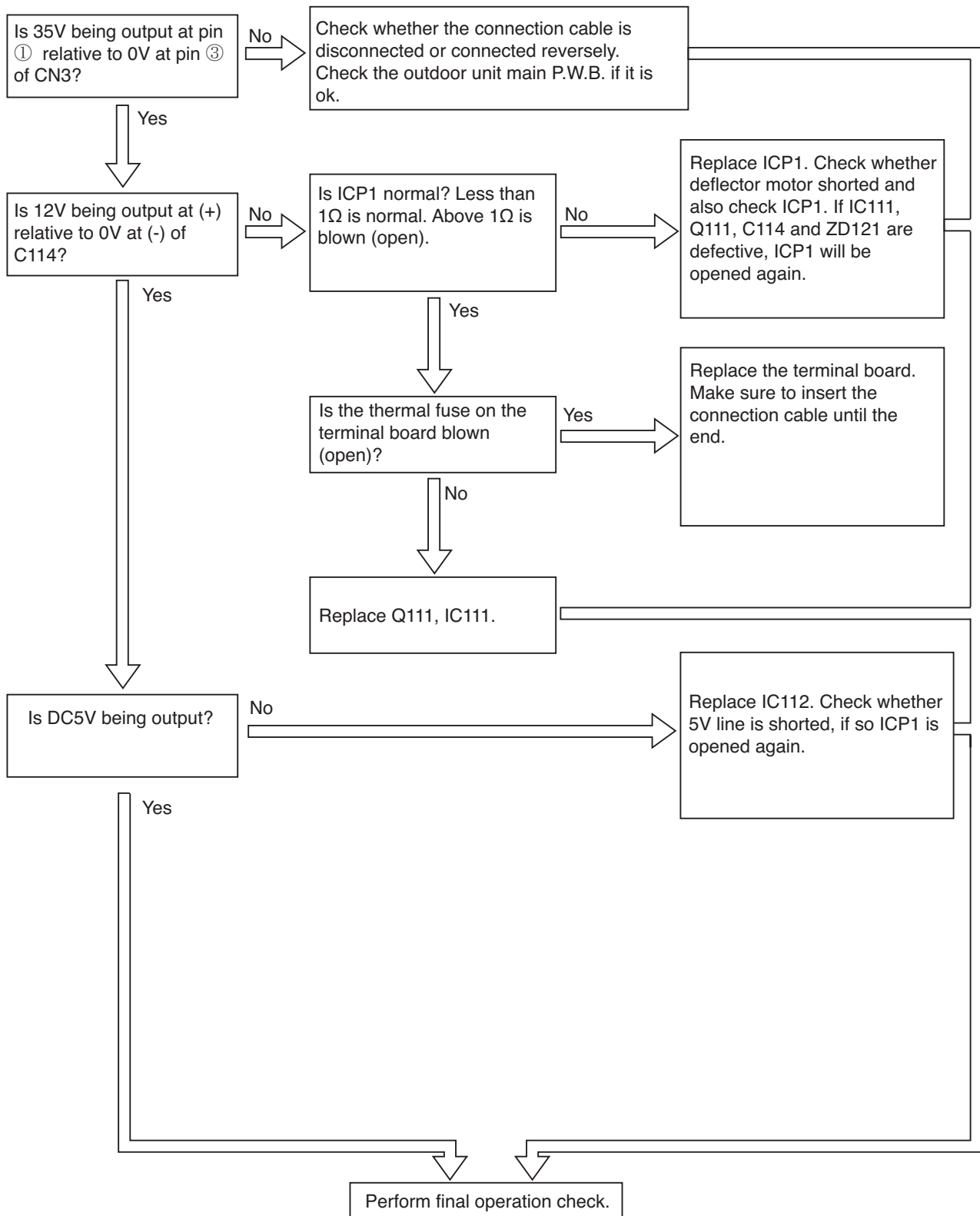
4. Air deflector does not move (others are normal)



5. All systems stop from several seconds minutes to several after operation is started (all indicators are also off)



6. Checking the main P.W.B (power circuit)



Self Diagnosis Memory Function

Defective modes stored in the non-volatile memory of the indoor unit are re-indicated by the remote controller operation. This is useful to check the defective mode when switching OFF the power or restarting the unit operation without checking the number of blinking of the defective indication lamp. (The defective mode which occurred the last is memorized.)

Defective modes of which occurrence frequency is too low to indicate on the indoor unit are also stored in the memory, thus defective phenomenon which was not checked at the visit can be found by clearing the memory and rechecking the memory contents later on.

Re-indication method for defective mode .

1. Turn the circuit breaker OFF and set the remote controller STOP position.
(No indication status.)
2. Turn the circuit breaker ON.
3. Set the remote controller COOL, and to be set 32°C and press the [①] button while pressing the [^] of temperature buttons. ⇒ Transmission
4. The main unit makes the receiving sound [Pi-] and becomes the defective indication mode. (Timer lamp goes on and off, but if the unit has no memory, the indication is not shown.)
5. Finish after turning the circuit breaker OFF. (Please turn OFF once without fail.)

Clear method for data of defective mode.

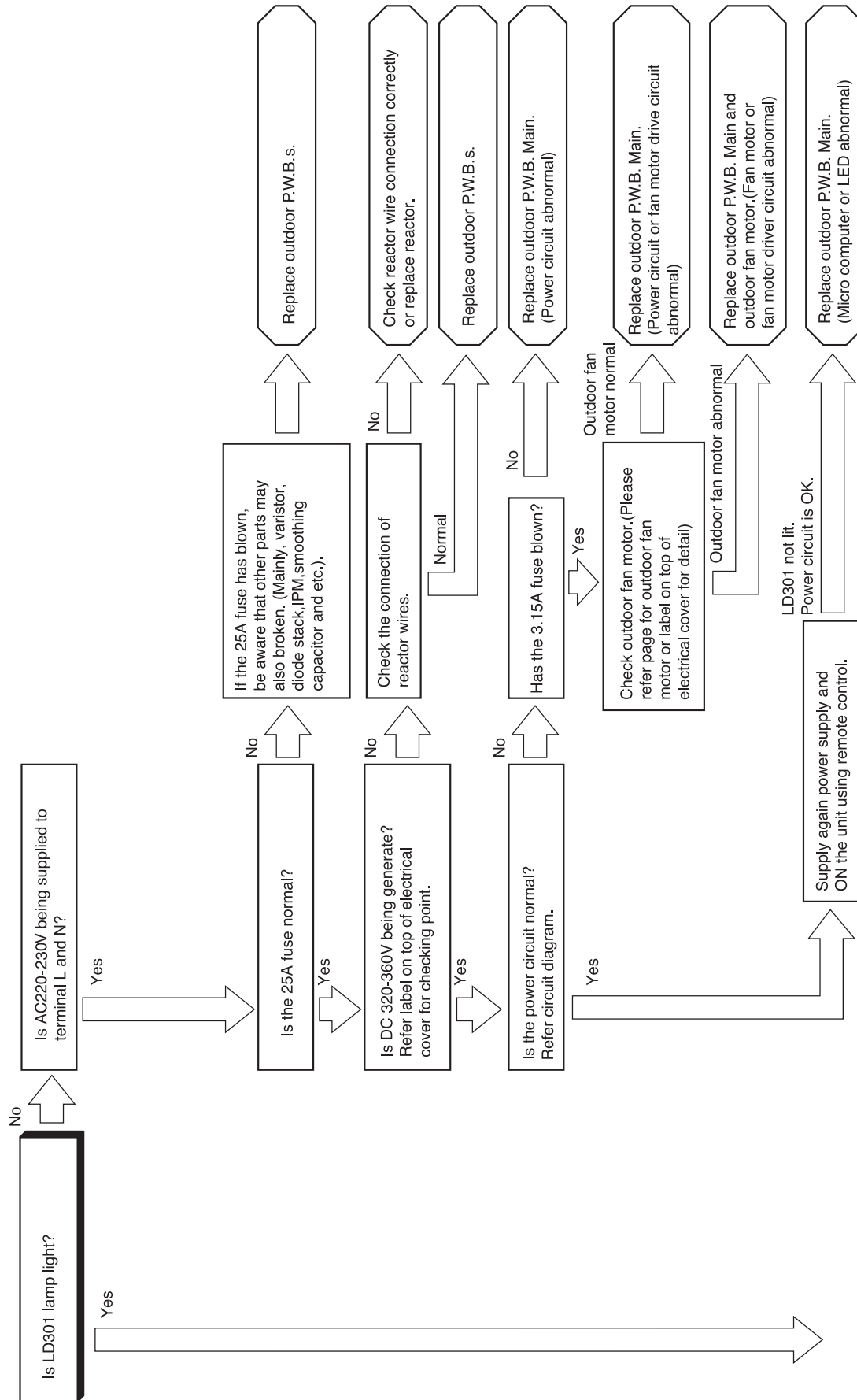
1. Proceed the re-indication of defective mode. (proceed without fail, after having the re-indication, do not operate the remote controller except for indicated ones.)
2. Turn the circuit breaker OFF. (Continue OFF more than 5 seconds.)
3. Turn the circuit breaker ON.
4. Set the remote controller HEAT and to be set 16°C and press the [①] button. while pressing the [V] of temperature buttons. ⇒ Transmission.
5. Finish the clear after having the receiving sound [Pii-] of one second.
6. Turn the circuit breaker OFF and finish. (Please turn OFF once without fail.)

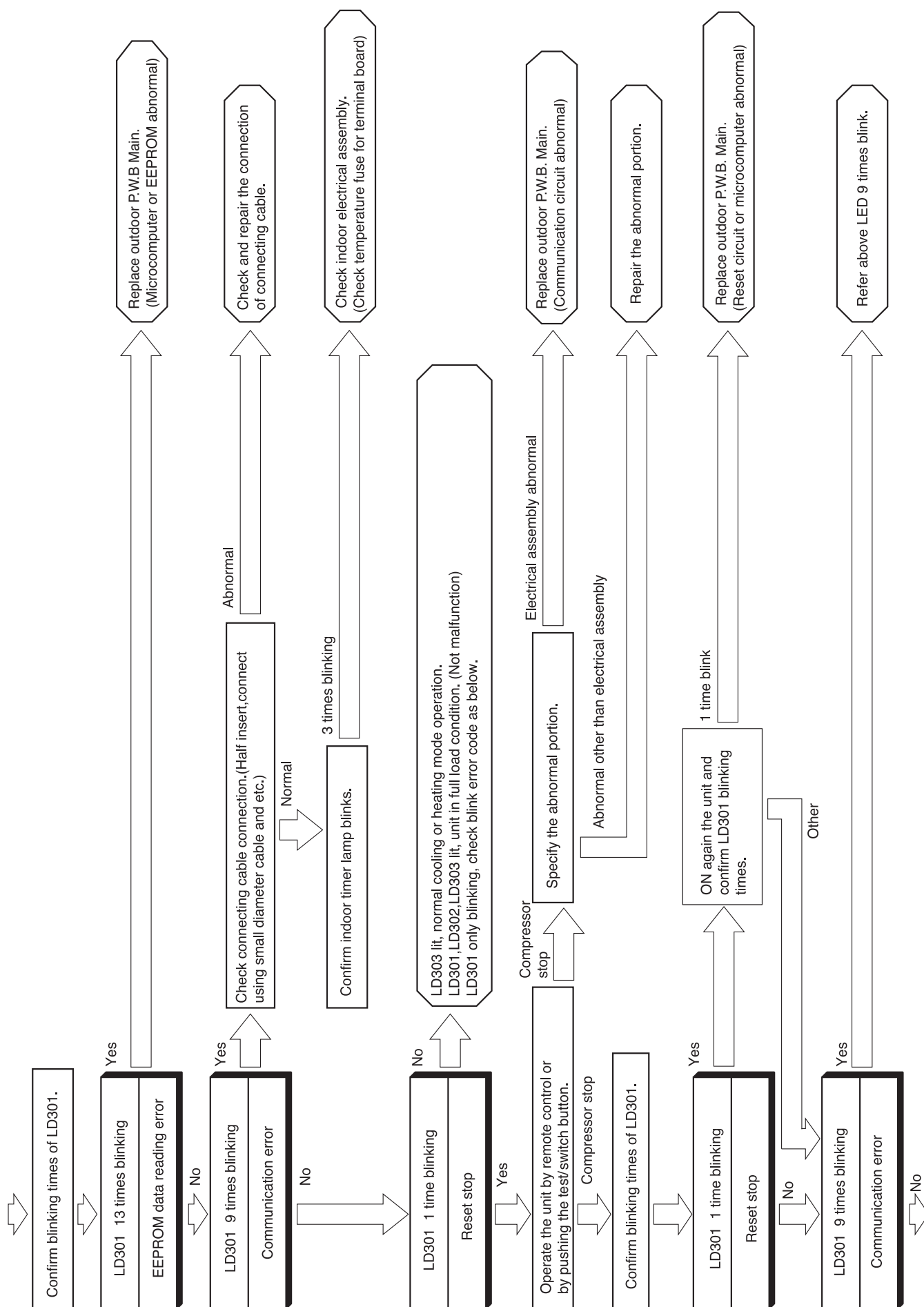
Notes

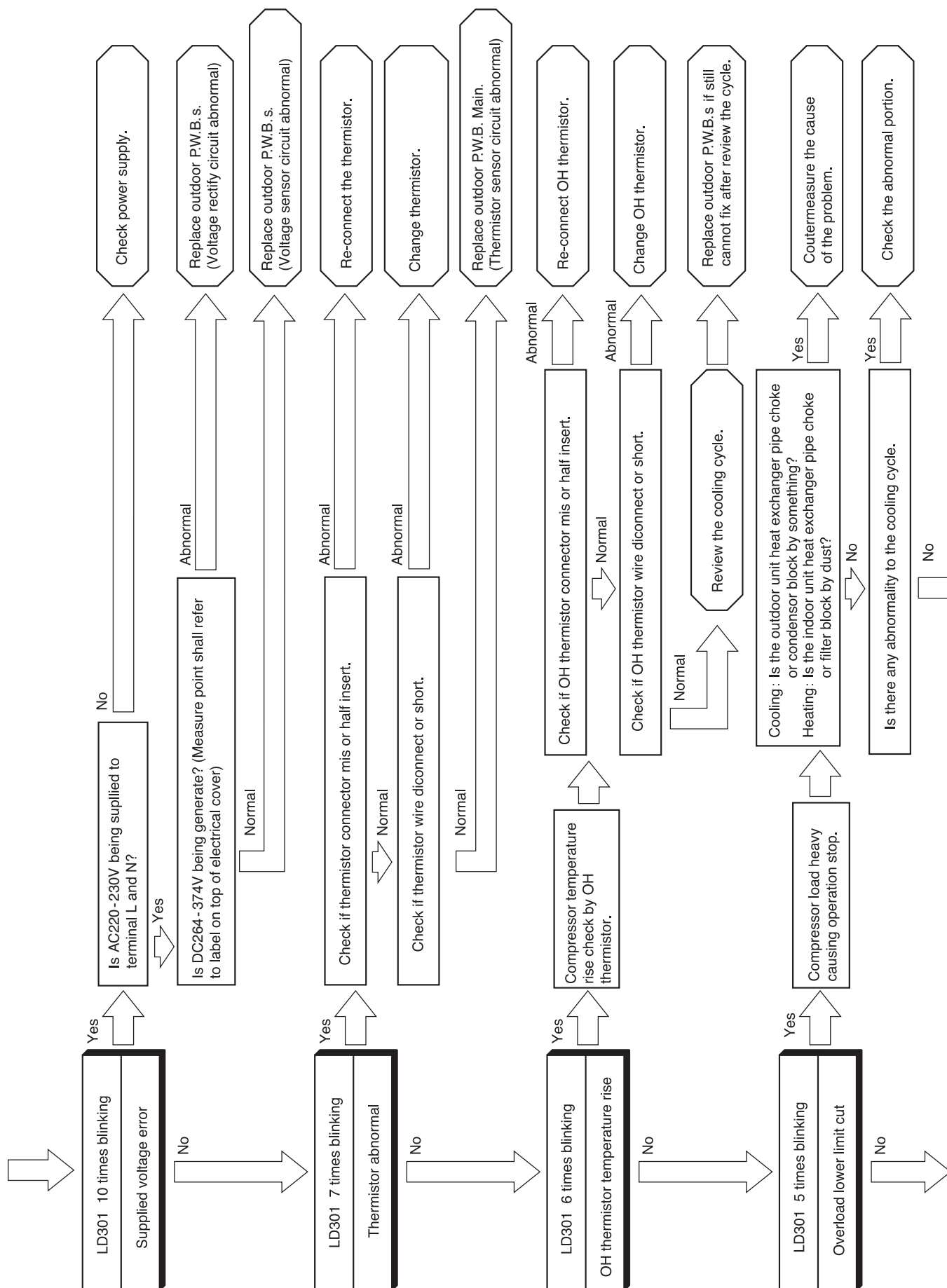
- This function is valid only once right after switching ON the power and does not work if other remote controller operation was made prior to it.
Take note that this function may not work when not following the above procedures.
(If it does not work, switch OFF the power and try again.)
- If nothing is stored in the memory, the lamp does not blink even if re-indication operation is carried out.
- After carrying out re-indication operation, the remote controller operation will not be accepted once the data has been cleared. To carry out normal operation, switch OFF the power beforehand.

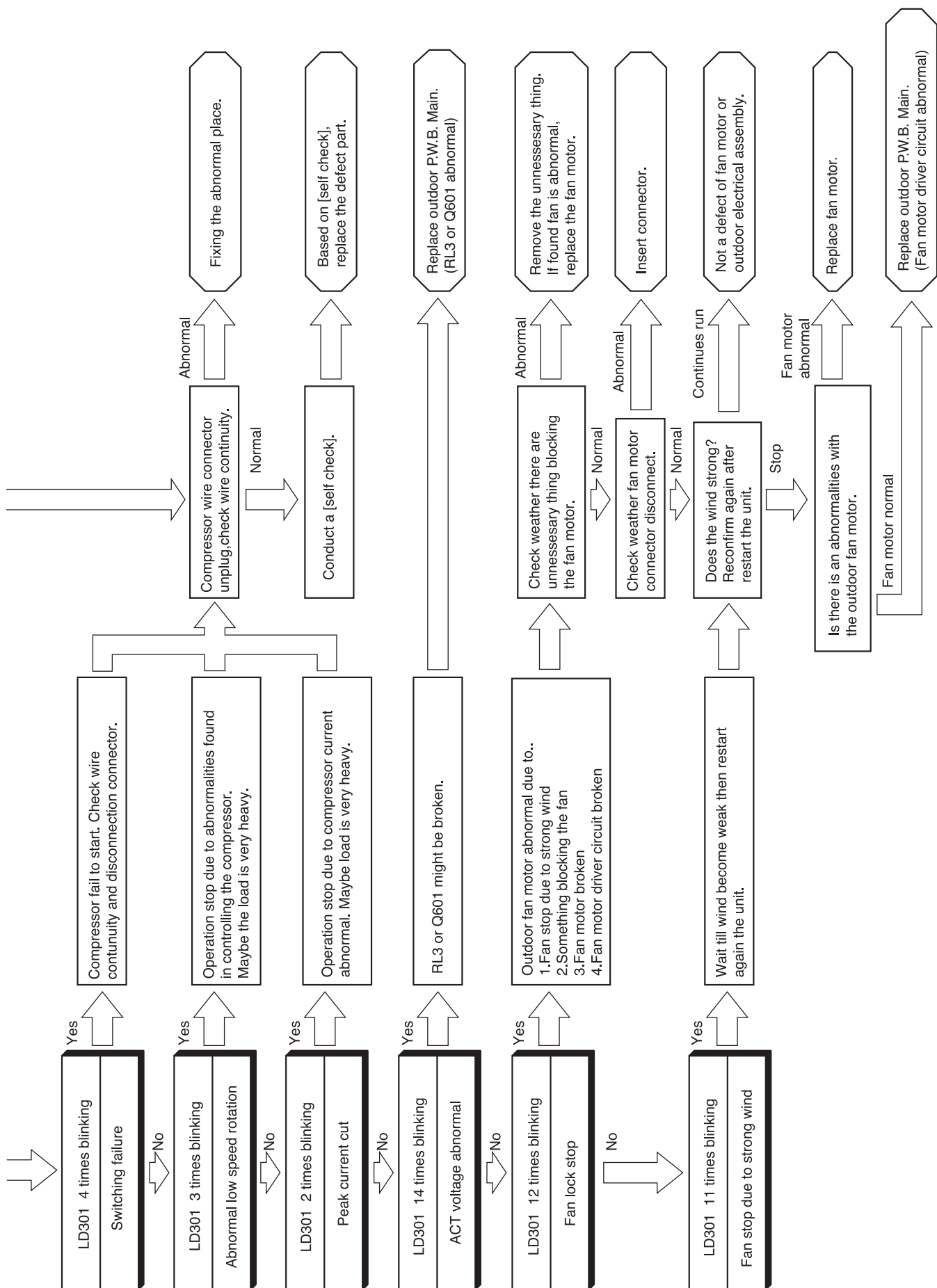
CHECKING THE OUTDOOR UNIT ELECTRICAL PARTS

MODEL RAC-18/25/35WSPA









SELF CHECK

When self-diagnosis lamp blinks 2,3,4 and 5 times happen, to determine whether compressor faulty or electrical unit faulty, please conduct a SELF CHECK as below.

1. Switch OFF main power supply.
 2. Short circuit between JW001 and JW002.
 3. Switch ON main power supply – LD302 will blink 1 time.
 4. (Within 3 minutes) Press Test/ Switch for 1 second or more.
 5. Self-diagnosis result will be shown – LD303 will ON (LIT) and LD301 will be blinking. Then refer to diagnosis table 2.
 6. Switch OFF main power supply. Then release back JW001 and JW002 to original condition (no short circuit condition).
- If step No. 6 is not carried out, the system will not operate properly until 3 minutes has lapsed after restore the power supply.

SELF CHECK diagnosis result

SELF-DIAGNOSIS LIGHTING MODE ■ LIT ☑ BLINKING □ OFF				
LD301	LD302	LD303	SELF-DIAGNOSIS RESULT	REPAIR METHOD
RED	RED	RED		
☑	□	■	ELECTRICAL OK	① CHANGE COMPRESSOR
1 TIME				
☑	□	■	PEAK CURRENT CUT OFF	① CHANGE P.W.B.s
2 TIMES				
☑	□	■	COMPRESSOR CURRENT ABNORMAL	① IF COMPRESSOR CONNECTOR LOOSE OR NG - CHECK CONNECTOR CONDITION ② IF COMPRESSOR CONNECTOR OK, - CHECK COMPRESSOR, CHANGE P.W.B.s
7 TIMES				
☑	□	■	DC VOLTAGE ABNORMAL	① IF AC VOLTAGE INPUT ABNORMAL (OVER STANDARD VOLTAGE $\pm 10\%$), - FOLLOW STANDARD AC VOLTAGE INPUT ② IF AC VOLTAGE INPUT IS NORMAL (WITHIN $\pm 10\%$), - CHANGE P.W.B.s
10 TIMES				
☑	□	■	EEPROM READING ERROR	① CHANGE P.W.B. MAIN
13 TIMES				

In case abnormalities found in measurement result, change the defect part.

In case electrical is normal and before it can be use, modify back

JW001 and JW002 as normal condition (before conduct a self check).

In case of service person forgot to release JW001 and JW002 to original condition;

Case 1:

If main power supply continuously ON, outdoor microcomputer will keep showing diagnosis result (LD303 will ON and LD301 will blinks).

Case 2:

If main power supply OFF at once, then switch ON again:

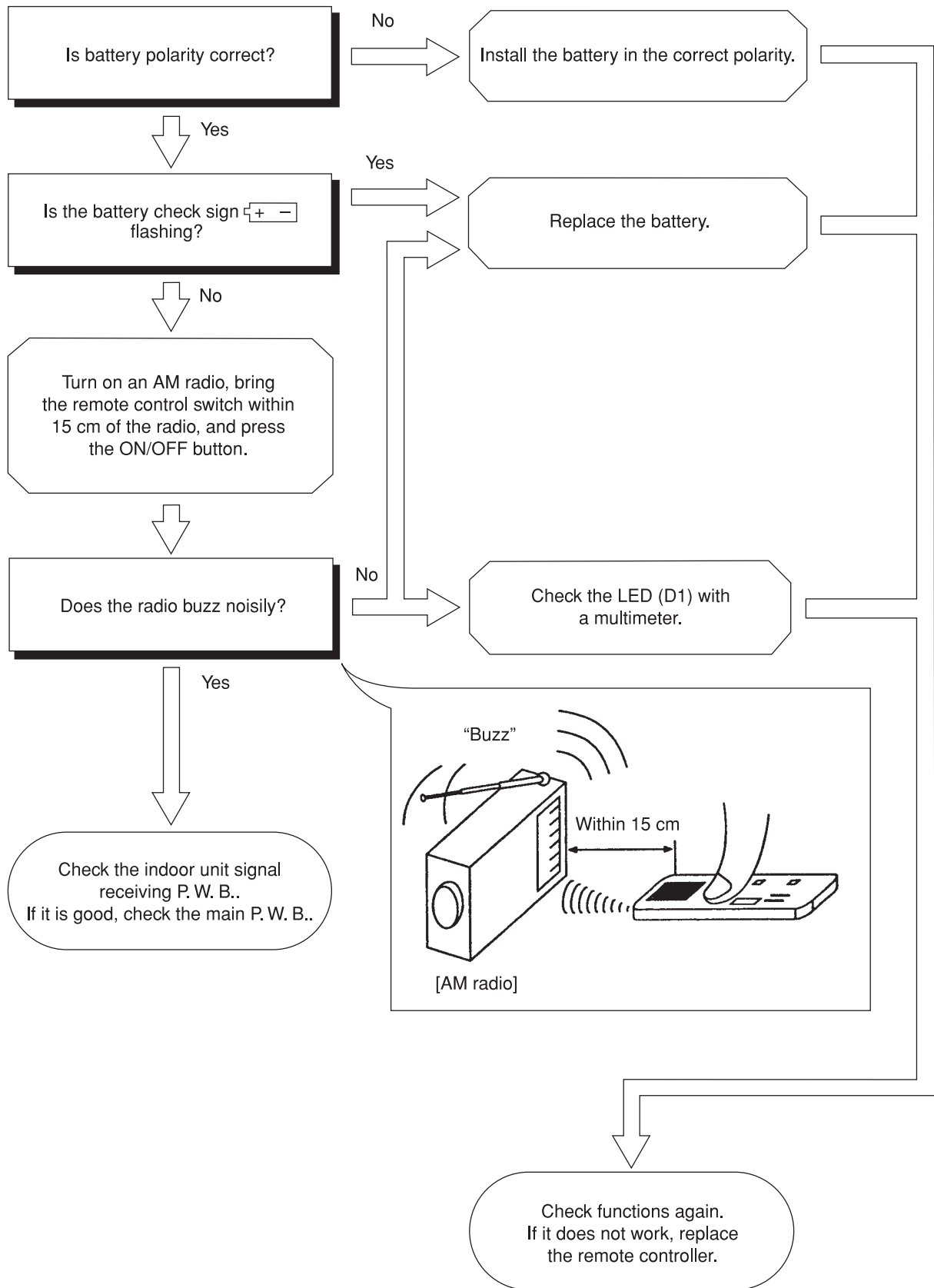
- a) Outdoor microcomputer will wait the self check command (by pressing test/service switch) within 3 minutes (LD302 blinks 1 time).
If test/service signal input is not received, unit will return to normal operation mode after this 3 minutes has lapsed. (LD302 OFF and LD301 blinks 1 time).

Case 3:

If main power supply OFF at once, then switch ON again and on indoor unit by remote control;

- a) Indoor unit will receive remote control signal and send signal to outdoor unit. For the first 3 minutes, outdoor microcomputer will ignore this indoor signal (LD302 blinks 1 time).
- b) After 3 minutes has lapsed (LD302 OFF and LD301 blinks 1 time), unit will return to normal operation mode.

CHECKING THE REMOTE CONTROLLER



HOW TO CHANGE THE SHIFT VALUE SETTING TEMPERATURE

The shift value setting temperature for Cooling and Heating mode operation can be change using remote controller. (This procedure shall be implemented strictly by service personnel only.)

(For initial shift value temperature setting for Cooling mode (SHIFTC) and Heating operation mode (SHIFTW) :
Please refer to page 37)

PROCEDURES

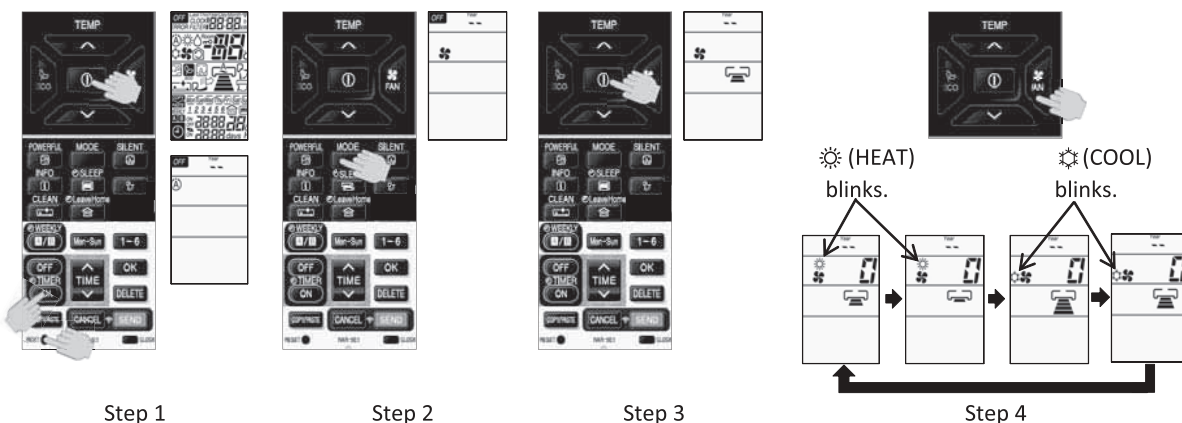
1. While pressing and holding (START/STOP) button and (ON) button, press [RESET] button on the same. Release [RESET] button only and make sure that all marks on the remote controller display are indicated, then release the (START/STOP) button and [ON] button. Remote controller now enters "Shift Value Change Mode".

2. Press the (MODE) selector button so that the display indicates (FAN) mode.

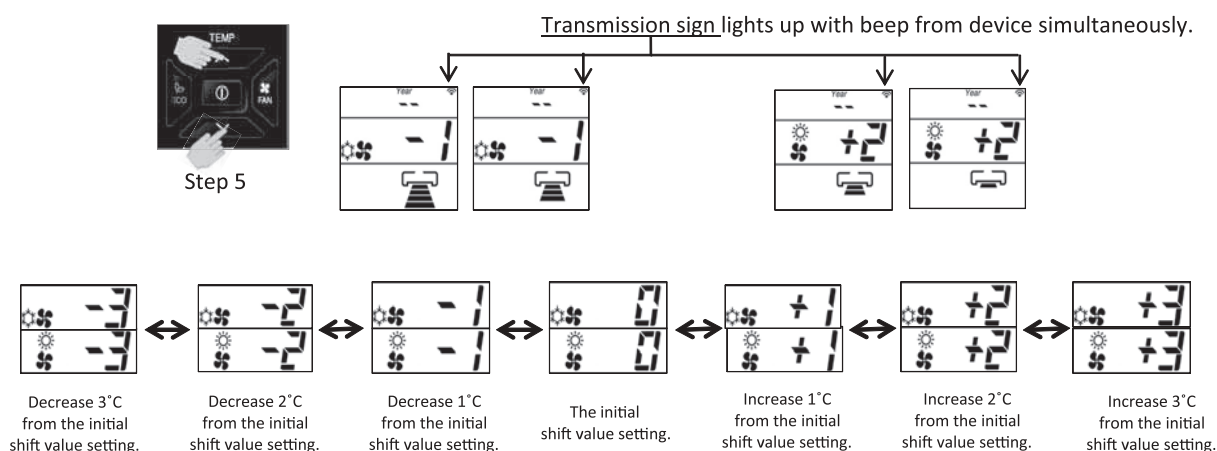
3. Press the (START/STOP) button and FAN operation will be started.

4. Set the FAN SPEED with the (FAN SPEED) button according to the following FAN speed setting in order to choose the desired operation mode that is required for shift value setting temperature modification.

- To change the shift value for COOLING mode operation, select either (HIGH) or (MED) FAN SPEED.
- To change the shift value for HEATING mode operation, select either (LOW) or (SILENT) FAN SPEED.



5. Press the (TEMP $\vee$ or $\wedge$) button to change the shift value.
(The shift value changed with device beep sound.)



NOTE :

- (1) The displayed shift value, (HEAT) and (COOL) symbol on the remote controller display will be disappear after 10 seconds.
- (2) The changed shift value will remain unchanged after turned off the power.
- (3) If "0" is displayed on the remote controller display, it indicates the shift value is now at the initial setting.

SETTING THE PREVENTION OF MUTUAL INTERFERENCE FOR REMOTE CONTROLLER

(Applicable for Remote controller model : RAR-5E1, RAR-5E2, RAR-5E3, RAR-5E4 and RAR-5E5)

Case : 2 sets of indoor units installed near to each other.

If both indoor units can receive the same remote controller signal, please set the remote controller as below. (This setting will change the signal address of each remote controller.)

Initial remote controller signal address setting is **A**.

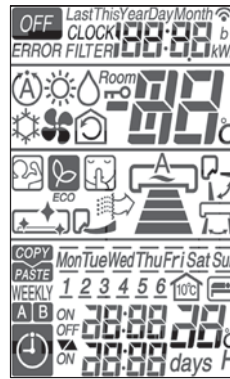
This procedure change the remote controller signal address from **A** to **B**.

1. The circuit breaker for the other unit shall be OFF.



2. Slide the remote controller cover to take it off.

3. While directing the remote controller towards the receiver of the indoor unit, press **1-6** button, **ON** (ON TIMER) button and **RESET** (RESET) button simultaneously. (The remote controller perform signal transmission with the device.)



Signal transmission : From A to B



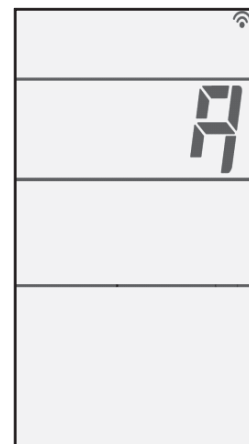
4. The indoor unit beeps [Pip] to indicate that it has just received the signal from remote controller.



5. Please check the usability of each set of indoor unit using its own remote controller.

Note : If indoor unit still not receive the correct signal from the correct remote controller, setting shall be made again.
By setting again for the 2nd time, the signal address will change from **B** to **A**. Then, if repeat again for the 3rd time, the remote controller signal address will change from **A** to **B**.
Please set the DIP switch No.6 to ON accordingly (Refer to page 54).

Signal transmission : From B to A



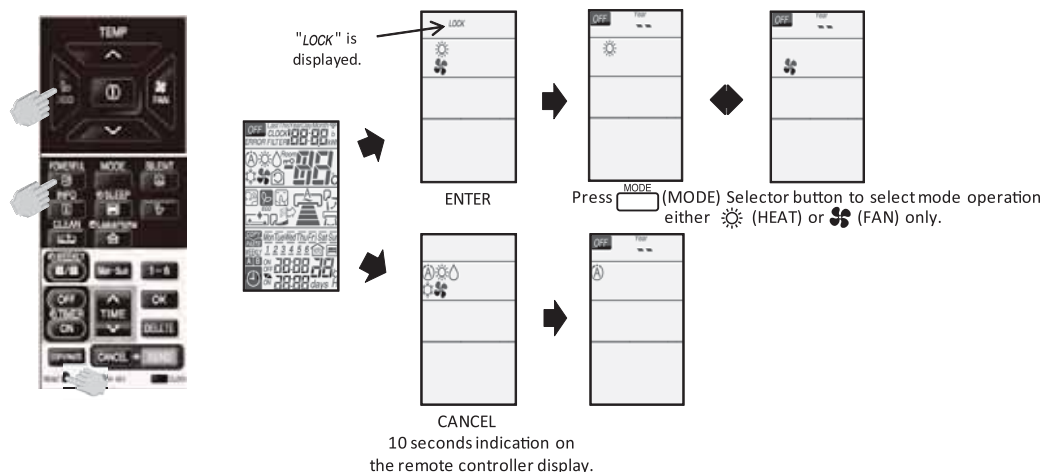
OPERATION MODE LOCK SETTING

If Dip switch position is set at "Heating mode only" or "Cooling mode only" as mentioned on page 54, it is required to set the remote controller into operation mode lock setting. Without setting the remote controller, it will caused unmatched signal transmission between indoor unit and remote controller.

PROCEDURE

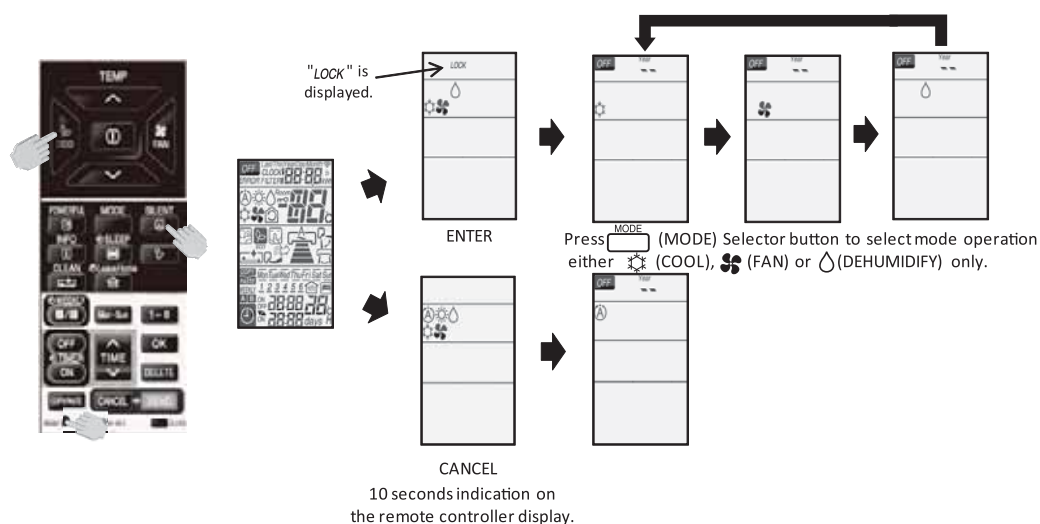
1. Heating operation mode lock setting

- (a) While pressing and holding  (ECO) button and  (POWERFUL) button, press  (RESET) button on the same time. Release  (RESET) button only and make sure that all marks on the remote controller display are indicated, then release the  (ECO) button and  (POWERFUL) button. Remote controller now enters "Heating operation mode lock".
- (b) To cancel the "Heating operation mode lock", repeat the above procedure (1(a)).



2. Cooling operation mode lock setting

- (a) While pressing and holding  (ECO) button and  (SILENT) button, press  (RESET) button on the same time. Release  (RESET) button only and make sure that all marks on the remote controller display are indicated, then release the  (ECO) button and  (SILENT) button. Remote controller now enters "Cooling operation mode lock".
- (b) To cancel the "Cooling operation mode lock", repeat the above procedure (2(a)).



NOTE :

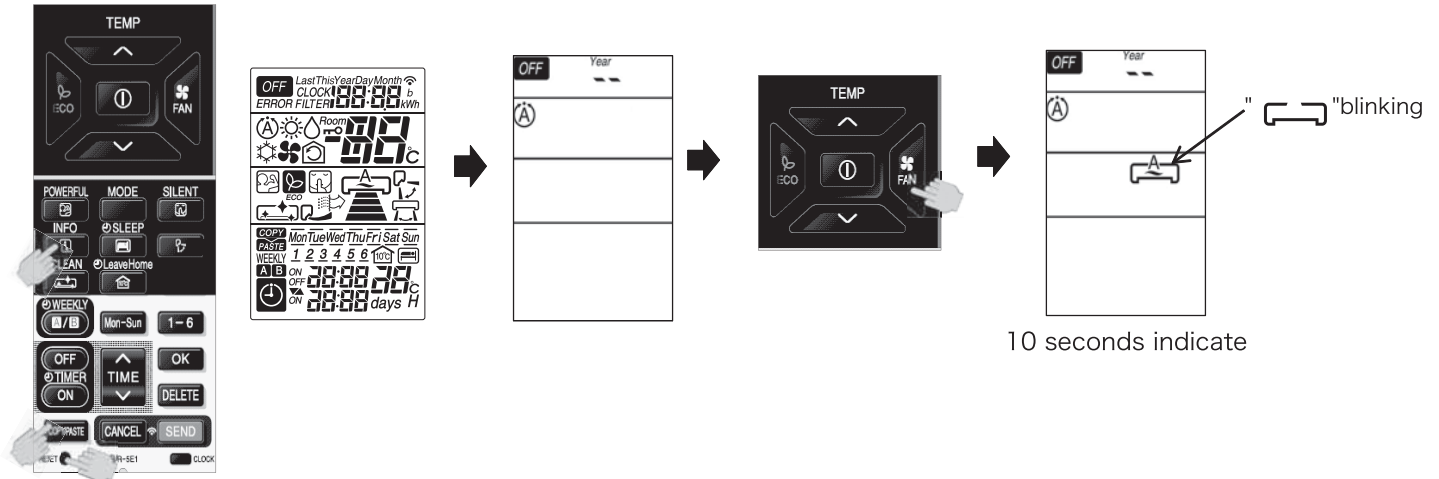
- The indication of "  " and "  " (HEAT), "  " (COOL), "  " (FAN) or "  " (DEHUMIDIFY)) mode operation symbol on the remote controller display will disappear after 10 seconds and it will enters to OFF condition indicated by  on the display.
- The OPERATION MODE LOCK setting will remain in the remote controller memory eventhough the remote controller is ran out of battery.

DISPLAY OPERATION MODE SETTING

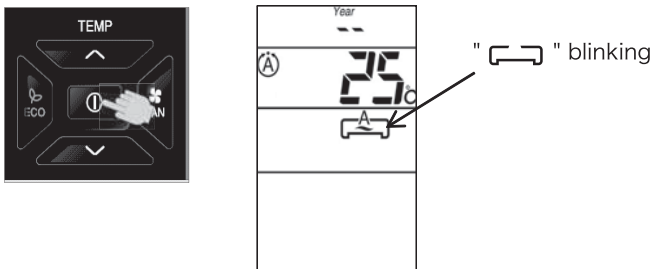
For operating indoor unit independently (without outdoor unit connection), remote controller has to be set according to below procedures before send the signal to the indoor unit. New communication format between indoor and outdoor is required to communicate with outdoor unit.

PROCEDURE

- While pressing and holding  (INFO) button and  (COPY/PASTE) button, press  (RESET) button on the same time. Release  (RESET) button only and make sure that all marks on the LCD display are indicated, then release the  (INFO) button and  (COPY/PASTE) button. Remote controller now enters "DISPLAY OPERATION MODE" for the indoor unit to run independently. Please ensure that when pressing  (FAN) button, "" will blinking.



- Press the  (MODE) selector button to choose the desired operation mode.
- Press  (START/STOP) button.
Then, the indoor unit will starts to operate independently accoring the selected operation mode.



NOTE :

- (1) During "DISPLAY OPERATION MODE", " blinks on LCD of remote controller.
- (2) When operation stops, "DISPLAY OPERATION MODE" is canceled.

CHECKING THE REFRIGERATING CYCLE

(JUDGING BETWEEN GAS LEAKAGE AND COMPRESSOR DEFECTIVE)

1. Troubleshooting procedure (No operation, No heating, No cooling)

Connect U,V,W phase leads to the power module again and operate the air conditioner.

Is the self-diagnosis lamp mode as shown on the right?

YES

Stop to operate and check the gas pressure in balancing mode.

Error (Gas leaking)

Gas leaks.
Repair and seal refrigerant.

Normal

• Checking the IPM (main P.W.B.)

When the self-diagnosis lamp lights in the same condition as above.

The compressor is defective. Replace it and seal refrigerant.

(If the compressor checker for an inverter type air conditioner is available, re-check using it.)

Perform a final check of operation.

Lighting mode Self-diagnosis lamp	Blinks 2 times	Blinks 3 times	Blinks 4 times	Blinks 5 times	Blinks 6 times	Blinks 8 times
LD301						
Time until the lamp lights	Approx. 10 seconds			Approx. 10 seconds	Within Approx. 30 seconds	Approx. 10 seconds
Possible malfunctioning part	Compressor				Gas leakage	Compressor

 Blinking

 off

Outdoor air temperature (°C)	Charge port pressure MPa(G) {kgf/cm ² (G)}
50	2.96 {30.14}
45	2.62 {26.72}
40	2.31 {23.58}
35	2.03 {20.73}
30	1.78 {18.14}
25	1.55 {15.79}
20	1.34 {13.66}
15	1.15 {11.74}
10	0.98 {10.02}
5	0.83 {8.48}
0	0.70 {7.10}
-5	0.58 {5.89}
-10	0.47 {4.81}

(R410 A)

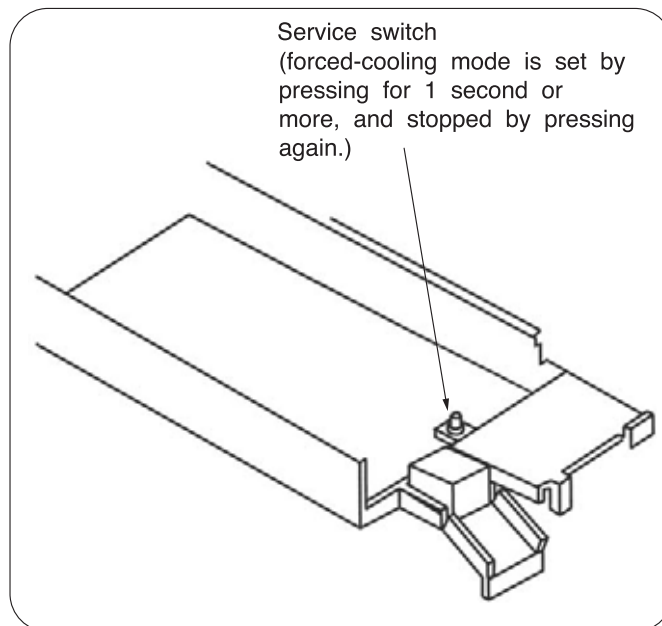
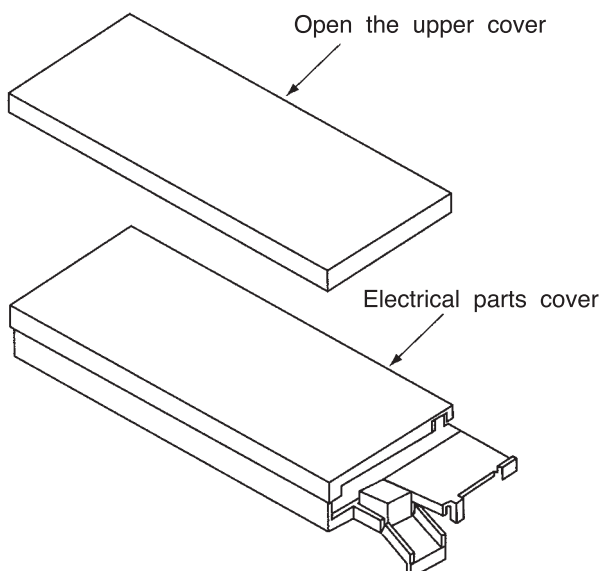
The values above are the theoretical ones.

HOW TO OPERATE USING THE SERVICE SWITCH THE OUTDOOR UNIT

Model: RAC- 18/25/35WSPA

1. Turn the power switch off and then turn on again.
2. Remove the electrical parts cover.

Never operate the unit in this state for more than 5 minutes.



(Cautions)

- (1) If interface signal (35V DC) terminals C and D are not connected when the outdoor unit service switch is used for checking, the outdoor unit defect indicator (LD301) will blink 9 times after operation to indicate communication error.
- (2) If checking is done with the compressor connector disconnected, the unit will continue normal operation when the electrical parts are normal, or it will repeat operating for approx. one minute and stop due to overload power limit cut, or it will operate in the overload status.

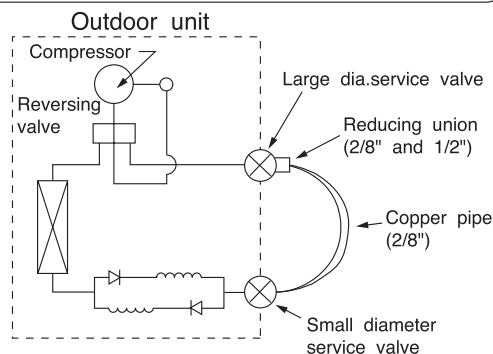
Be sure to return the service switch to "normal" after checking with service operation is completed.

HOW TO OPERATE THE OUTDOOR UNIT INDEPENDENTLY

1. Connect the large dia. pipe side and small dia. pipe side service valves using a pipe.

Connect the small diameter service valve and the large diameter service valve using the reducing union and copper pipe as shown on the right.

Charge refrigerant of 300g after vacuuming (※1)



Parts to be prepared

- (1) Reducing union
2/8" (6.35mm)
1/2" (12.7mm)
- (2) Copper pipe (2/8" and 1/2")
- (3) Shorting leads
2 leads approx. 10 cm long with alligator clip or IC clip

Do not operate for 5 minutes or more.

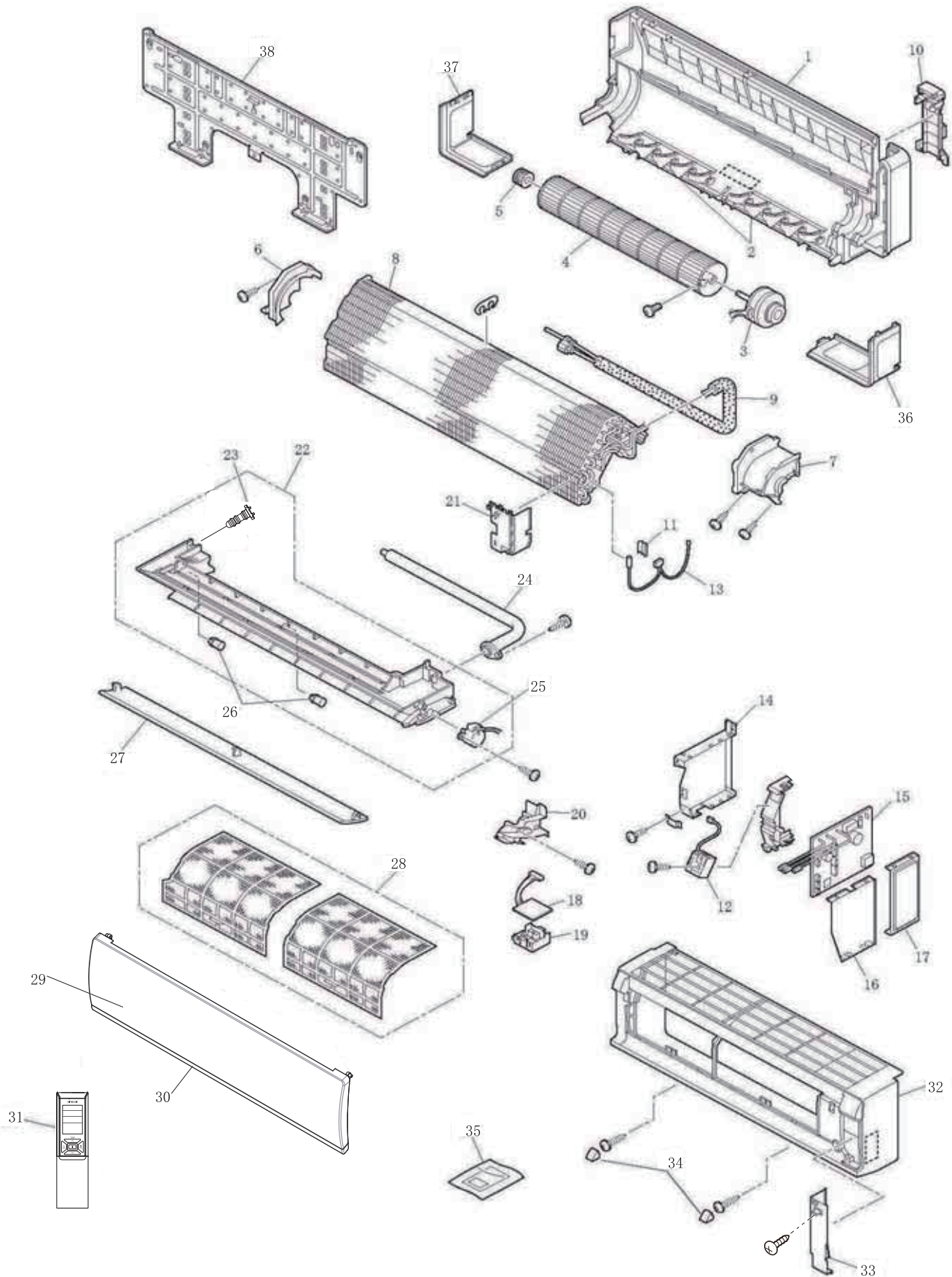
The operation method is the same as "How to operate using the connector to servicing the outdoor unit".

※1 The charging amount of 300g is equivalent to the load in normal operation.

PARTS LIST AND DIAGRAM

INDOOR UNIT

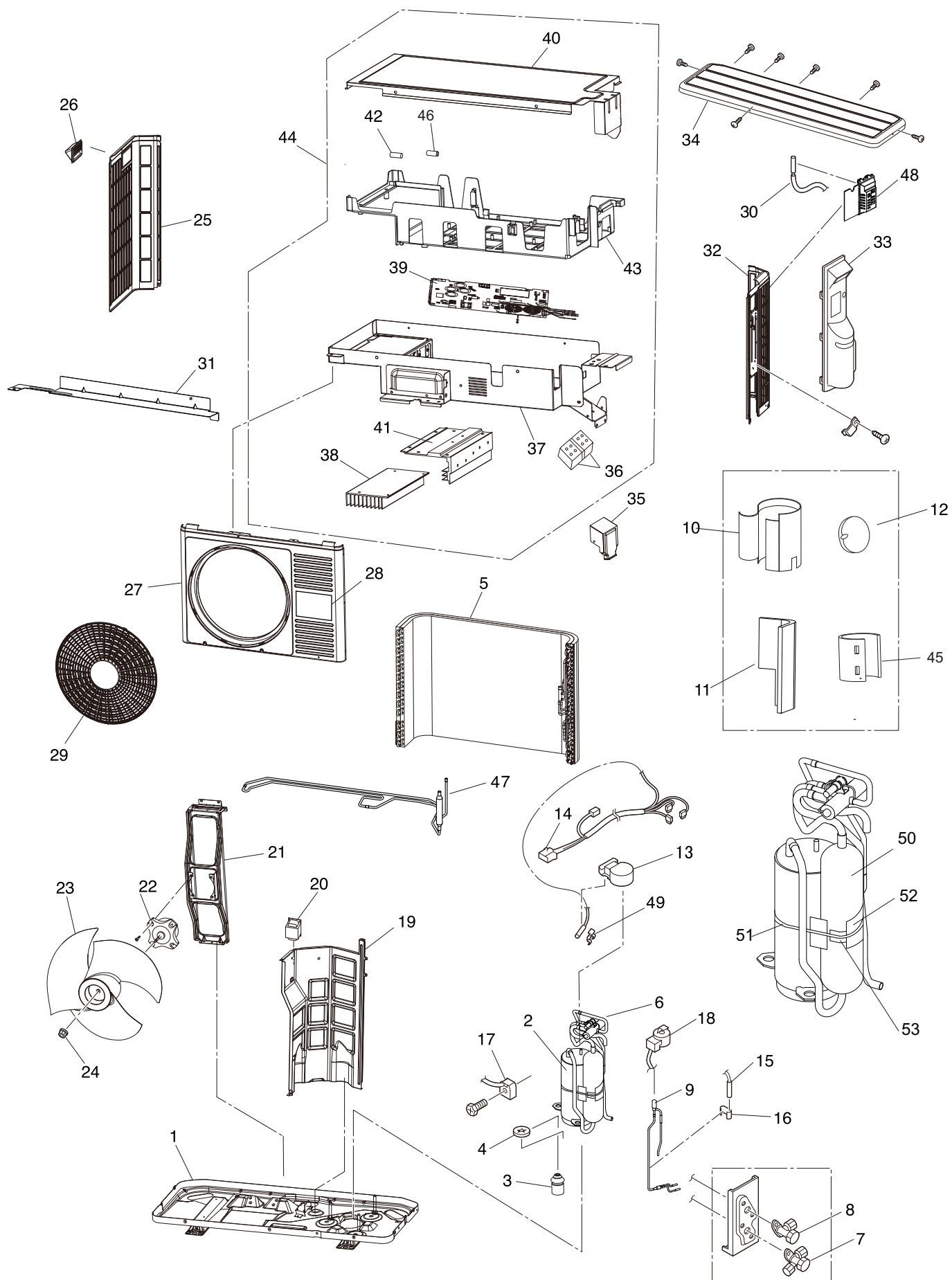
MODEL: RAK-18PSPA,RAK-25PSPA,RAK-35PSPA



INDOOR UNIT

MODEL RAK-18PSPA,RAK-25PSPA,RAK-35PSPA

NO.	HHAW PARTS NO.			Q"TY/ UNIT	PARTS NAME
	RAK-18PSPA	RAK-25PSPA	RAK-35PSPA		
1	HWRAK-18PSPA 901			1	CABINET ASS'Y
2	HWRAK-25PEA 902			2	VERTICAL AIR DEFLECTOR
3	HWRAS-E10H3 903			1	FAN MORTOR
4	HWRAK-18PSPA 902			1	TANGENTIAL AIR FLOW FAN
5	HWRAK-18PSPA 903			1	FAN SUPPORT ASS'Y
6	HWRAS-E10H3 905			1	FAN COVER
7	HWRAK-18PSPA 904			1	FAN MOTOR SUPPORT
8	HWRAK-18PSPA 905			1	EVAPORATOR ASS'Y
9	HWRAK-18PSPA 906			1	PIPING ASS'Y
10	HWRAS-E10H3 909			1	UPPER COVER
11	HWRAK-18PSPA 907			1	SPRING
12	HWRAS-E10H3 910			1	TERMINAL BOARD (2P)
13	HWRAS-E10H3 911			1	THERMISTOR ASS'Y
14	HWRAK-25PEA 903			1	COVER(ELECTRIC)
15	HWRAK-18PSPA 908	HWRAK-25PSPA 901	HWRAK-35PSPA 901	1	P. W. B. (MAIN)
16	HWRAS-E10H3 914			1	ELEC-COVER-L
17	HWRAS-E10H3 915			1	ELEC-COVER-R
18	HWRAK-25PEA 905			1	P. W. B. (INDICATION)
19	HWRAS-E10H3 917			1	LED-COVER
20	HWRAS-E10H3 918			1	FC-GUIDE
21	HWRAS-E10H3 919			1	PIPE-COVER
22	HWRAK-18PSPA 909			1	DRAIN PAN ASS'Y
23	HWRAK-18PSPA 919			1	DRAIN CAP
24	HWRAS-E10H3 921			1	DRAINAGE PIPE
25	HWRAK-18PSPA 910			1	STEPPING MOTOR
26	HWRAK-18PSPA 911			2	DEFLECTOR SUPPORT
27	HWRAK-18PSPA 912			1	HORIZONTAL AIR DEFLECTOR
28	HWRAS-E10H3 924			1	AIR FILTER
29	HWRAK-25PEA 906			1	FRONT PANEL AS
30	HWRAK-25PEA 907			1	K-PANLE
31	HWRAK-18PSPA 913			1	REMOTE CONTROL ASS'Y
32	HWRAK-18PSPA 914			1	FRONT COVER
33	HWRAS-E10H3 927			1	T-COVER ASS'Y
34	HWRAS-E10H3 928			2	CAP
35	HWRAS-E10H3 929			1	H-LABEL
36	HWRAS-E10H3 930			1	S-COVER-R
37	HWRAS-E10H3 931			1	S-COVER-L
38	HWRAS-E10H3 932			1	MOUNTING PLATE



NO.	HHAW PARTS NO.			Q ^{TY} /UNIT	PARTS NAME
	RAC-18WSPA	RAC-25WSPA	RAC-35WSPA		
1		HWRAC-18WSA A01		1	BASE
2		HWRAC-18WSA A02		1	COMPRESSOR
3		HWRAC-18WSA A03		3	COMPRESSOR RUBBER
4		HWRAC-SX10HAK A04		3	PUSH NUT
5		HWRAC-18WSA A04		1	CONDENSER ASSEMBLY
6		HWRAC-18WSPA A01		1	REVERSING VALVE(INCLUDING 2S/3S-VALVE&EXPANSION VALVE)
7		HWRAC-50WEA A06		1	3S-VALVE
8		HWRAC-50WEA A05		1	2S-VALVE
9		HWRAC-18WSPA A02		1	ELECTRIC EXPANSION VALVE
10		HWRAC-18WSPA A03		1	SOUND PROOF
11		HWRAC-18WSPA A04		1	SOUND PROOF
12		HWRAC-18WSPA A31		1	SOUND PROOF
13		HWRAC-18WSA A10		1	OVERLOAD RELAY COVER(COMPRESSOR)
14		HWRAC-18WSA A11		1	CONNECTING CORD(COMPRESSOR)
15		HWRAC-50NX2 A16		1	DEFROST THERMISTOR
16		HWRAC-50NX2 A17		1	BULB SUPPORT(DEFROST THERMISTOR)
17		HWRAC-50NX2 A18		1	COIL(REVERSING VALVE)
18		HWRAC-50NX2 A19		1	COIL(EXPANSION VALVE)
19		HWRAC-18WSPA A05		1	PARTITION ASSEMBLY
20		HWRAC-18WSPA A06		1	REACTOR
21		HWRAC-SX18HAK A19		1	FAN MOTOR SUPPORT
22		HWRAC-50NX2 A23		1	FAN MOTOR
23		HWRAC-50NX2 A24		1	PROPELLER FAN
24		HWRAC-50NX2 A25		1	NUT (PROPELLER FAN)
25		HWRAC-50NX2 A26		1	SIDE COVER (LEFT)
26		HWRAC-50NX2 A27		1	HANDLE
27		HWRAC-50NX2 A28		1	FRONT COVER
28		HWRAC-18WSA A11		1	LOGO LABEL
29		HWRAC-SX18HAK A24		1	DISCHARGE GRILL
30		HWRAC-18WSPA A08		1	THERMISTOR(OUTDOOR TEMPERATURE)
31		HWRAC-18WSPA A09		1	COVER(FOR OUTDOOR TEMPERATURE THERMISTOR
32		HWRAC-SX18HAK A26		1	SIDE COVER (RIGHT)
33		HWRAC-SX18HAK A27		1	VALVE COVER
34		HWRAC-18WSPA A10		1	TOP COVER
35		HWRAC-18WSPA A11		1	TERMINAL COVER
36		HWRAC-18WSPA A12		2	TERMINAL BOARD (2P)
37		HWRAC-18WSPA A13		1	ELECTRIC PARTS PLATE
38		HWRAC-18WSPA A14		1	HEAT SINK
39	HWRAC-18WSPA A15	HWRAC-25WSPA A01	HWRAC-35WSPA A01	1	P. W. B (CONTROL)
40		HWRAC-18WSPA A16		1	ELECTRIC PARTS COVER
41		HWRAC-18WSPA A17		1	HEAT SINK2
42		HWRAC-18WSPA A18		1	FUSE (25A)
43		HWRAC-18WSPA A19		1	SUPPORT (P. W. B CONTROL)
44	HWRAC-18WSPA A20	HWRAC-25WSPA A02	HWRAC-35WSPA A02	1	P. W. B (CONTROL) ELECTRIC ASSEMBLY
45		HWRAC-18WSPA A21		1	SOUND PROOF COVER
46		HWRAC-18WSPA A22		1	FUSE (3. 15A)
47		HWRAC-18WSPA A23		1	HOT GAS PIPE
48		HWRAC-18WSPA A24		1	C-CAP
49		HWRAC-18WSPA A25		1	SPRING
50		HWRAC-18WSPA A26		1	S-TANK-ZU
51		HWRAC-18WSPA A27		1	BAND
52		HWRAC-18WSPA A28		1	RUB-BUSH
53		HWRAC-18WSPA A29		1	G-SHEET

HITACHI

RAK-18PSPA/RAC-18WSPA
RAK-25PSPA/RAC-25WSPA
RAK-35PSPA/RAC-35WSPA

HHAW NO. 0073E